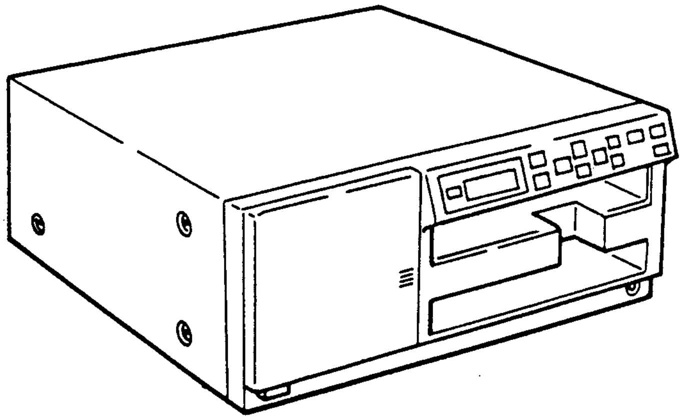
UP-5100/5150

SERVICE MANUAL

US Model
Canadian Model



SPECIFICATIONS

Printing system	Sublimation heat transfer printing
Number of picture elements	720 × 468 PELS (for normal size)
Total gradation	256 levels each for yellow, magenta, and cyan
Printing time	Approximately 60 seconds (for color printing in normal size) Approximately 24 seconds (for monochrome printing)
TV system	Conforming to EIA standards
Video signal	
Input connectors	**RGB SYNC** (RGB video signal) * BNC connector, 0.7 Vp-p, 75 ohms (when the 75 ohms termination switch is set to ON) **R-Y Y B-Y** (Component signal) * BNC connector Y: 1 Vp-p, 75 ohms (when the 75 ohm termination switch is set to ON) R-Y B-Y: 0.7 Vp-p, 75 ohms (when 75 ohm termination switch is set to ON, offset 7.5% and 75% color bar) **S-VIDEO** (Separate luminance (Y) and chrominance (C) signals Y: 1 Vp-p C: 0.29 Vp-p 75 ohms (when the 75 ohm termination switch is set to ON) **VIDEO** (NTSC composite video signal) BNC connector, 1 Vp-p, 75 ohms (when the 75 ohm termination switch is set to ON), sync negative **AC IN** (for power input) **REMOTE 1** (front panel, for the supplied remote control unit only), special mini jack **REMOTE 2** (automatic printing connector) Stereo mini jack **RS-232C** (Computer control interface) D-SUB 25-pin connector * Either the RGB video signal or component signal is selected by the RGB/R-Y/Y/B-Y selector on the rear panel.
Output connectors	**RGB SYNC** (analog RGB singnal) BNC connector RGB: 0.7 Vp-p, 75 ohms terminated SYNC: 1 Vp-p **S-VIDEO** Y: 1 Vp-p, 75 ohms terminated C: 1 Vp-p, 75 ohms terminated **VIDEO** (NTSC composite video signal) BNC connector, 1 Vp-p, 75 ohms (when the 75 ohm termination switch is set to ON), sync negative **AC OUT** (for power output) unswitched, up to 2.5 A
Ink ribbon and printing sheet sets	Color printing pack: UPC-5010A (100 sheets) B & W printing pack: UPC-5020A (100 sheets) OHP printing pack: UPC-5030 (50 sheets)
Power requirements	100 to 120 V AC, 50/60Hz Input current 3.5 A (printer) plus 2.5 A (receptacle)
Power consumption	200W (printing gray pattern in normal size under 25°C)
Operating temperature	5°C to 35°C (40°F to 95°F)
Dimensions	About 424 × 190 × 472 mm (w/h/d) ($16\frac{3}{4} \times 7\frac{1}{2} \times 18\frac{3}{4}$ inches)
Weight	About 15.6 kg (34 lb 7 oz)
Supplied accessories	UPC-5010A color printing pack (1) Paper tray (1) Print tray (1) AC power cord (1) Remote control unit (1) Dry battery SUM-3 (NU) (2) Connecting cable for the remote control unit (1) Warranty card (1) Instruction manual (1) Quick reference card (1)

– Continued on page 2 –

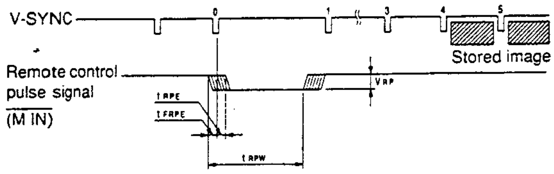
COLOR VIDEO PRINTER

SONY®

Using the automatic printing capabilities (REMOTE 2)
If you send the remote control pulse signals illustrated below through the REMOTE 2 connector, you can both store and print video images automatically.

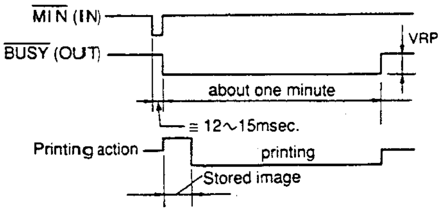
To begin, turn on the power and select the input signal.
Set the monitor display to the input signal because the printer's timing mechanism doesn't work properly when the monitor displays the memory. Press SOURCE/MEMORY to change the display from memory to input.
Send a remote control pulse signal.
If you are printing more than one image, be sure to return the monitor display to the input signal after every image is stored.

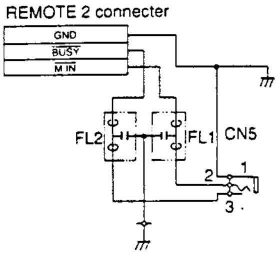
Regulations of remote control pulse ($\overline{\text{M IN}}$)



Nortation	Parameter	MIN	TYP	MAX	Unit	Remarks
t_{RPE}	Time within which a remote control pulse should be cleared to zero.	0	–	5	msec	
t_{FRPE}	Time within which a remote control pulse should be cleared to zero.	0	–	5	msec	
t_{RPW}	Length of a remote control pulse.	15	–	–	msec	
V_{RP}	Amplitude of a remote control pulse.	–	–	5	V	This value is based on TTL standards.

The relation between $\overline{\text{MI N}}$ and $\overline{\text{BUSY}}$.





Design and specifications are subject to change without notice.

WARNING !!

AN ISOLATION TRANSFORMER SHOULD BE USED DURING ANY SERVICE TO AVOID POSSIBLE SHOCK HAZARD, BECAUSE OF LIVE CHASSIS.
THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE AC POWER LINE.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

ATTENTION!!

AFIN D'EVITER TOUT RISQUE D'ELECTROCUTION PROVENANT D'UN CHÂSSIS SOUS TENSION, UN TRANSFORMATEUR D'ISOLEMENT DOIT ETRE UTILISÉ LORS DE TOUT DÉPANNAGE.
LE CHÂSSIS DE CE RÉCEPTEUR EST DIRECTEMENT RACCORDÉ À L'ALIMENTATION SECTEUR.

ATTENTION AUX COMPOSANTS RELATIFS À LA SÉCURITÉ!!

LES COMPOSANTS IDENTIFIÈS PAR UNE TRAME ET PAR UNE MARQUE ⚠ SUR LES SCHÉMAS DE PRINCIPE, LES VUES EXPLOSÉES ET LES LISTES DE PIECES SONT D'UNE IMPORTANCE CRITIQUE POUR LA SÉCURITÉ DU FONCTIONNEMENT. NE LES REMPLACER QUE PAR DES COMPOSANTS SONY DONT LE NUMÉRO DE PIÉCE EST INDIQUÉ DANS LE PRÉSENT MANUEL OU DANS DES SUPPLÉMENTS PUBLIÉS PAR SONY. LES RÉGLAGES DE CIRCUIT DONT L'IMPORTANCE EST CRITIQUE POUR LA SÉCURITÉ DU FONCTIONNEMENT SONT IDENTIFIES DANS LE PRÉSENT MANUEL. SUIVRE CES PROCÉDURES LORS DE CHAQUE REMPLACEMENT DE COMPOSANTS CRITIQUES, OU LORSQU'UN MAUVAIS FONCTIONNEMENT EST SUSPECTÉ.

SAFETY CHECK-OUT

(US Model only)

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Check that all control knobs, shields, covers, ground straps, and mounting hardware have been replaced. Be absolutely certain that you have replaced all the insulators.
4. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
5. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
6. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
7. Check the condition of the monopole antenna (if any).
   Make sure the end is not broken off, and has the plastic cap on it. Point out the danger of impalement on a broken antenna to the customer, and recommend the antenna's replacement.
8. Check the B+ and HV to see they are at the values specified. Make sure your instruments are accurate; be suspicious of your HV meter if sets always have low HV.
9. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

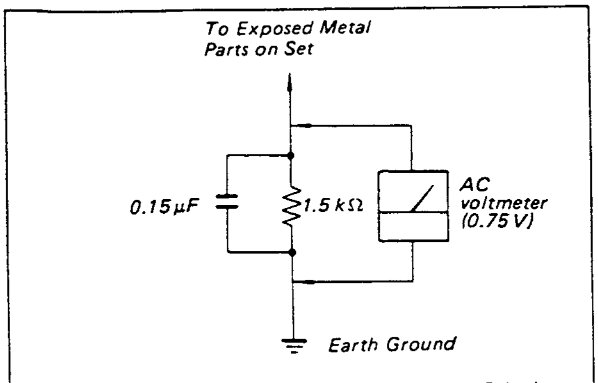


Fig. A. Using an AC voltmeter to check AC leakage.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

HOW TO FIND A GOOD EARTH GROUND

A cold-water pipe is guaranteed earth ground; the cover-plate retaining screw on most AC outlet boxes is also at earth ground. If the retaining screw is to be used as your earth-ground, verify that it is at ground by measuring the resistance between it and a cold-water pipe with an ohmmeter. The reading should be zero ohms. If a cold-water pipe is not accessible, connect a 60–100 watts trouble light (not a neon lamp) between the hot side of the receptacle and the retaining screw. Try both slots, if necessary, to locate the hot side of the line, the lamp should light at normal brilliance if the screw is at ground potential. (See Fig. B)

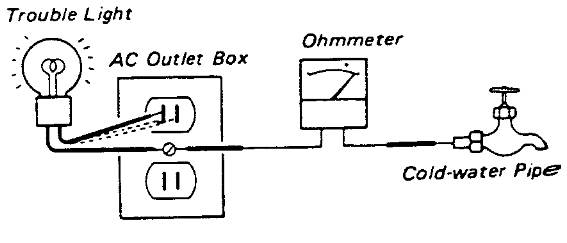


Fig. B. Checking for earth ground.

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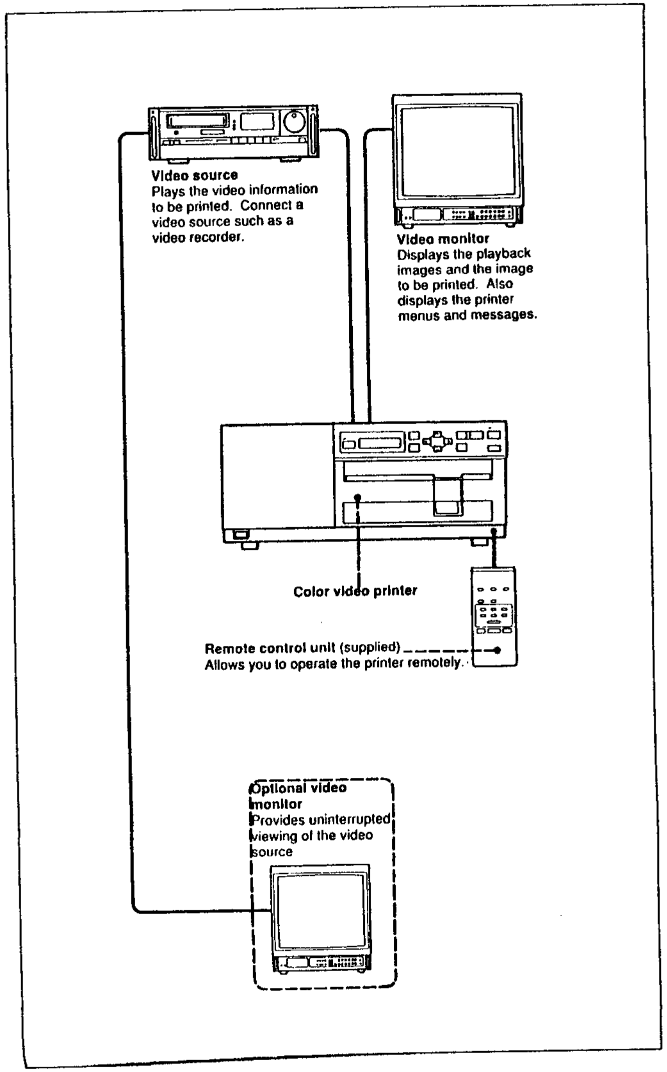
SECTION 1
GENERAL

This section is extracted from instruction manual

1-1. SYSTEM OVERVIEW

System configuration

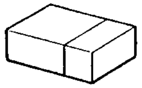
Connect a video machine capable of sending a video image to the printer. Connect a video monitor to the printer to view an image before printing it. If you connect another monitor to the video source, you can also view the moving video image being output by the source.


Video source
Plays the video information to be printed. Connect a video source such as a video recorder.
Video monitor
Displays the playback images and the image to be printed. Also displays the printer menus and messages.
Color video printer
Remote control unit (supplied)
Allows you to operate the printer remotely.
Optional video monitor
Provides uninterrupted viewing of the video source

Ink ribbon cassette and paper

The video printer uses ink ribbon cassettes and special paper. The cassette and sheets are sold as sets; a set for color printing on paper, for monochrome printing on paper, and for color printing on OHP transparencies. Use the appropriate cassette/paper set:

Color printing pack UPC-5010A (One pack is supplied)
One pack includes an ink ribbon cassette and 100 sheets of $5^3/_4$ x $8^3/_8$ paper.

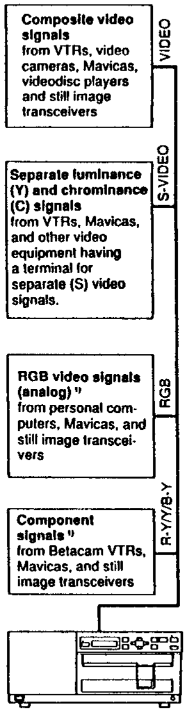


Monochrome printing pack UPC-5020A (not supplied)
One pack includes a B & W ink ribbon cassette and 100 sheets of $5^3/_4$ x $8^3/_8$ paper.

OHP printing pack UPC-5030 (not supplied)
One pack includes an OHP ink ribbon cassette and 50 sheets of $5^3/_4$ x $8^3/_8$ OHP transparencies.

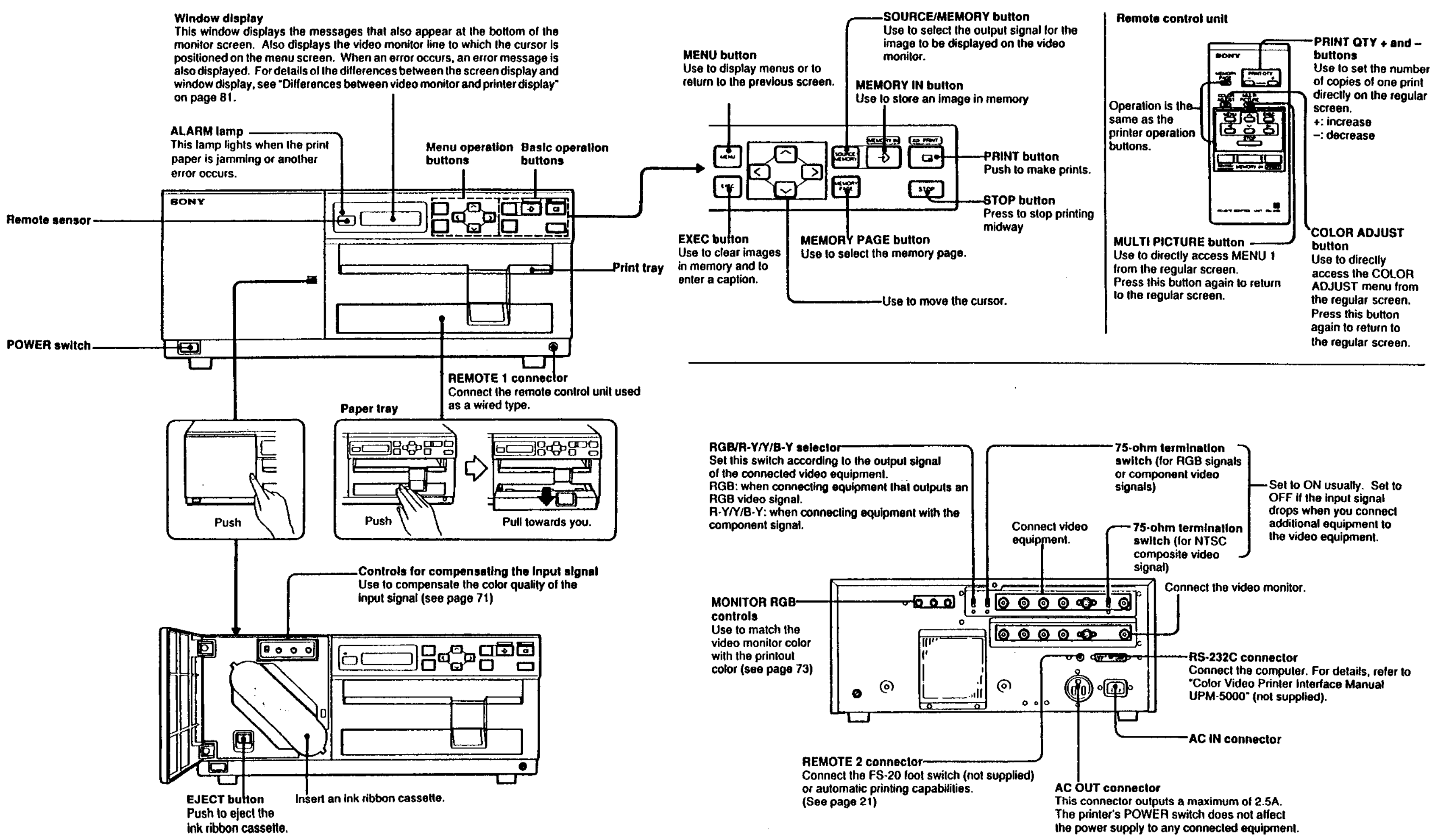
Video signals that can be processed by the color video printer

You can connect the following signal sources to the printer.
The signals outlined below can be processed by the color video printer. The way they are actually connected is described on page 18 .


Composite video signals
from VTRs, video cameras, Mavicas, videodisc players and still image transceivers
VIDEO
Separate luminance (Y) and chrominance (C) signals
from VTRs, Mavicas, and other video equipment having a terminal for separate (S) video signals.
S-VIDEO
RGB video signals (analog) 1)
from personal computers, Mavicas, and still image transceivers
RGB
Component signals 1)
from Betacam VTRs, Mavicas, and still image transceivers
R-Y/Y/B-Y

1) Switch between RGB video signals or component signals with the RGB/R-Y/Y/B-Y selector on the rear panel.

1-2. LOCATION AND FUNCTION OF PARTS AND CONTROLS



Window display
This window displays the messages that also appear at the bottom of the monitor screen. Also displays the video monitor line to which the cursor is positioned on the menu screen. When an error occurs, an error message is also displayed. For details of the differences between the screen display and window display, see "Differences between video monitor and printer display" on page 81.

ALARM lamp
This lamp lights when the print paper is jamming or another error occurs.

REMOTE 1 connector
Connect the remote control unit used as a wired type.

Controls for compensating the input signal
Use to compensate the color quality of the input signal (see page 71)

EJECT button
Push to eject the ink ribbon cassette.

MENU button
Use to display menus or to return to the previous screen.

SOURCE/MEMORY button
Use to select the output signal for the image to be displayed on the video monitor.

MEMORY IN button
Use to store an image in memory

PRINT button
Push to make prints.

STOP button
Press to stop printing midway

EXEC button
Use to clear images in memory and to enter a caption.

MEMORY PAGE button
Use to select the memory page.

Use to move the cursor.

PRINT QTY + and – buttons
Use to set the number of copies of one print directly on the regular screen.
+: increase
–: decrease

Operation is the same as the printer operation buttons.

MULTI PICTURE button
Use to directly access MENU 1 from the regular screen.
Press this button again to return to the regular screen.

COLOR ADJUST button
Use to directly access the COLOR ADJUST menu from the regular screen.
Press this button again to return to the regular screen.

RGB/R-Y/Y/B-Y selector
Set this switch according to the output signal of the connected video equipment.
RGB: when connecting equipment that outputs an RGB video signal.
R-Y/Y/B-Y: when connecting equipment with the component signal.

75-ohm termination switch (for RGB signals or component video signals)

75-ohm termination switch (for NTSC composite video signal)

Set to ON usually. Set to OFF if the input signal drops when you connect additional equipment to the video equipment.

MONITOR RGB controls
Use to match the video monitor color with the printout color (see page 73)

RS-232C connector
Connect the computer. For details, refer to "Color Video Printer Interface Manual UPM-5000" (not supplied).

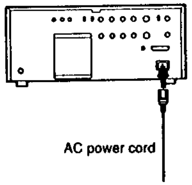
REMOTE 2 connector
Connect the FS-20 foot switch (not supplied) or automatic printing capabilities.
(See page 21)

AC OUT connector
This connector outputs a maximum of 2.5A.
The printer's POWER switch does not affect the power supply to any connected equipment.

1-3. CONNECTIONS

Make the necessary connections as follows.

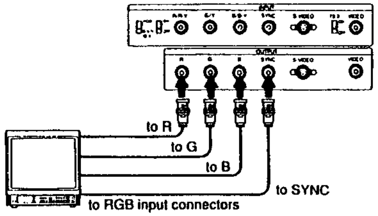
1 Connect the AC power cord.


AC power cord

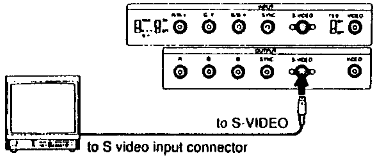
Note
For safety, connect the AC power cord to the AC outlet after you have made all connections.

2 Connect the video monitor.

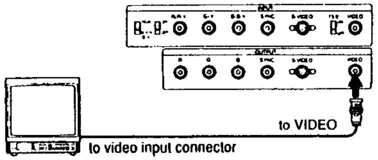
Connecting a monitor with RGB inputs


to R
to G
to B
to SYNC
to RGB input connectors

Connecting a video monitor with separate Y/C video input


to S-VIDEO
to S video input connector

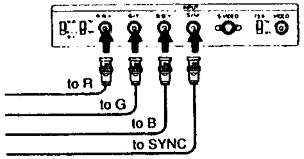
Connecting a video monitor with only NTSC composite video input


to VIDEO
to video input connector

Note
When you connect the printer to the NTSC composite video input, it may be difficult to match the color shown on the monitor with that of the printouts.

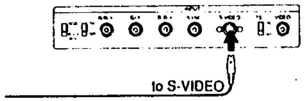
3 Connect video equipment.

Connecting equipment that outputs an RGB video signal [1]

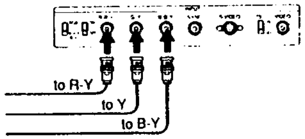

to R
to G
to B
to SYNC

You do not need to make a connection to the SYNC connector when a sync signal is added to the G signal.

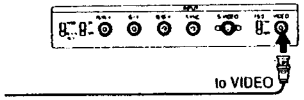
Connecting equipment that outputs a separate Y/C signal



Connecting equipment that outputs a component signal [2]


to R-Y
to Y
to B-Y

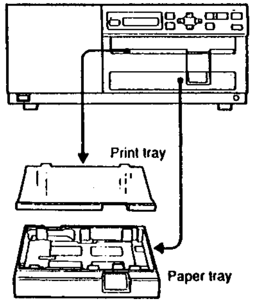
Connecting the equipment with an NTSC composite video signal



1) When you connect equipment that outputs an RGB video signal, set the RGB/R-Y/Y/B-Y selector to RGB.
2) When you connect equipment that outputs a component signal, set the RGB/R-Y/Y/B-Y selector to R-Y/Y/B-Y.

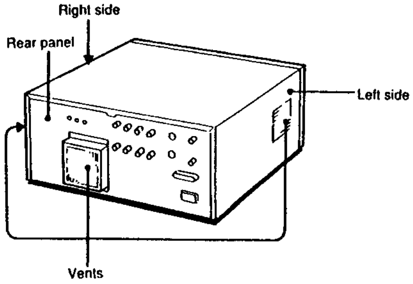
Assembly

Insert the supplied paper tray and print tray.


Print tray
Paper tray

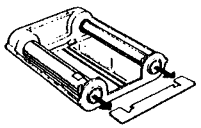
Location

Leave enough room around the printer for air to circulate through the vents on the left and right sides and out of the fan on the back panel.


Right side
Rear panel
Left side
Vents

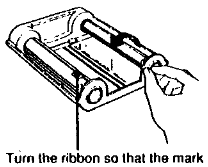
1-4. LOADING AN INK RIBBON CASSETTE

1 **Remove the stopper from the ink ribbon cassette.**



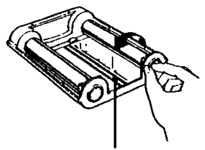
2 **Take up any slack in the ribbon to prevent it crumpling when you insert it.**

When using a new ink ribbon:



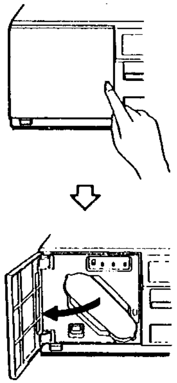
Turn the ribbon so that the mark indicating the start position is visible on the larger roll.

When using a half-used ribbon:

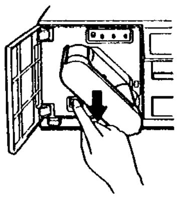


Position the black bars between the two rolls.

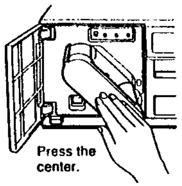
3 **Open the ribbon door**



4 **To remove an ink ribbon cassette from the printer, press the EJECT button and lift out the cassette.**

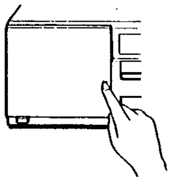


5 **Insert the new ink ribbon cassette and push it firmly in the center until it clicks into place.**

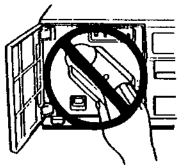


Press the center.

Close the ribbon door.



Caution
Never put your hand into the ink ribbon cassette dock. The thermal head becomes very hot. You may burn yourself if you touch it.

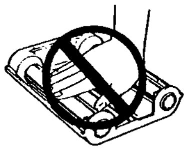


Notes on storing ink ribbons

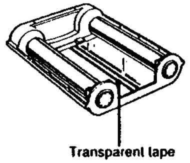
- Avoid placing the ink ribbon cassette in a location subject to:
  - – high temperatures
  - – high humidity
  - – excessive dust
  - – direct sunlight
- Keep the ribbon packaging for storing partially used ribbons.

Notes on using the ink ribbon cassette

- Do not touch the ribbon or place the cassette in a dusty area. Finger prints dust on the ink ribbon will leave imperfections on your printouts.



- If your ink ribbon should tear, repair the tear with transparent tape. There should be no problem in using the remaining portion of the ribbon.



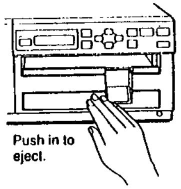
Transparent tape

Note
If you have to repair a ribbon with transparent tape, advance the ribbon to the next group of black bars before inserting the ink ribbon cassette into the printer.

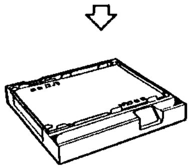
1-5. LOADING PRINT PAPER

Load paper into the color video printer as follows.

1 **Remove the paper tray.**



Push in to eject.

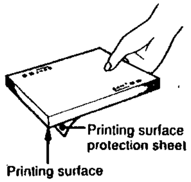


Remove the protection sheet if there is one in the tray.

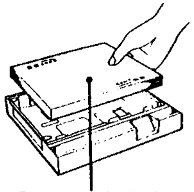
2 **Load the print paper in the paper tray.**

Ruffle the stack of printing paper before placing it into the tray.

Hold the print paper with the protection sheet at the bottom, being careful not to touch the printing surface.

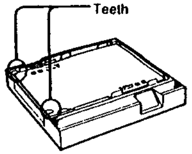


Place the paper in the paper tray.



The black marks should be facing up.

Load the paper securely under the teeth.

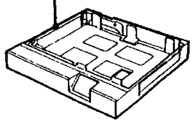


The paper will be fed into the printer from the top of the tray.

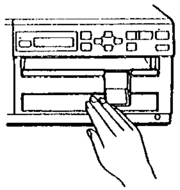
Note

The paper tray holds up to 100 sheets of paper (one package) or 50 OHP transparencies (one package). If you try to load more sheets than this, an error is likely to occur.

Load paper up to this line. Leave a space between the teeth and the print paper.

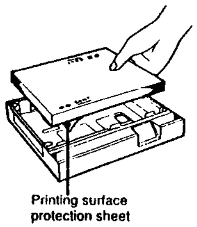


3 **Slide the paper tray back into the printer. Push it in until it clicks into place.**



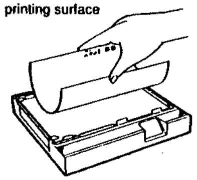
Loading transparencies (OHP sheets)

When placing OHP transparencies into an empty tray, load the transparencies with the protection sheet on the bottom.



When placing OHP transparencies into a tray which already contains paper, load the sheets on top of the paper with their printing surface down and the back marks facing up.

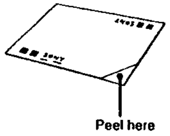
Do not touch the printing surface

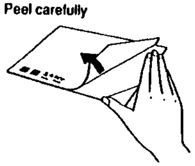


It is not necessary to include a protection sheet.

Preparing OHP transparencies

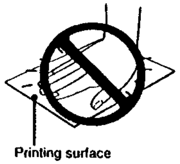
After you have printed on an OHP sheet, peel it from its backing paper. Never attempt to peel it before printing.





Note on using paper and OHP transparencies

Do not touch the printing surface. Fingerprints or dust stuck to the printing surface will remain as imperfections. When handling the paper and OHP sheets, keep the protection sheet in place to keep the printing surface clean.



Notes on storing paper and transparencies (OHP sheets)

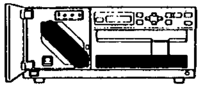
- Avoid placing the paper or OHP sheets in a location subject to:
  - high temperatures
  - high humidity
  - excessive dust
  - direct sunlight
- Keep the packaging for storing unused paper and OHP transparencies.

1-6. MAKING PRINTS

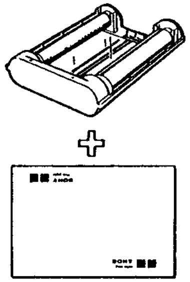
This section explains how to print a full-size image. The following explanation covers the basic printing operation.

Note
If your printer is set to print four or nine reduced images, change the setting to full-size before printing.

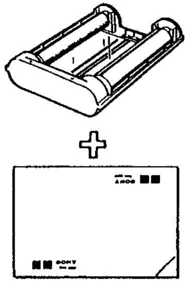
1 Check the ink ribbon cassette and the paper.



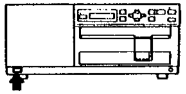
To print on paper

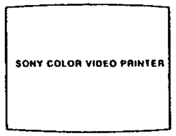


To print on OHP transparencies

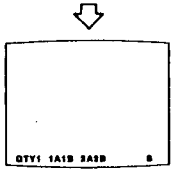


2 Turn on the printer and the video monitor.

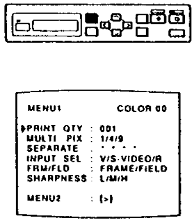




When the printer is ready, the following screen appears.



3 Press the MENU button to display the MENU 1 screen.

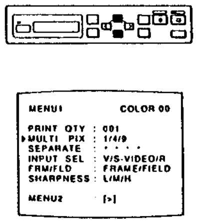


```
MENU1              COLOR 00

▶PRINT QTY  : 001
 MULTI PIX  : 1/4/9
 SEPARATE   . • • • •
 INPUT SEL  : V/S-VIDEO/R
 FRM/FLD    : FRAME/FIELD
 SHARPNESS  : L/M/H

 MENU2      : [>]
```

4 Select the input signal for the image you want to print.

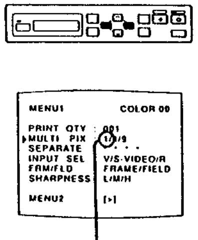
See "Selecting the Input signal."

5 Move the cursor ▶ to MULTI PIX by pressing the ⍓ or ⍌ buttons.



```
MENU1              COLOR 00

 PRINT QTY  : 001
▶MULTI PIX  : 1/4/9
 SEPARATE   : • • • •
 INPUT SEL  : V/S-VIDEO/R
 FRM/FLD    : FRAME/FIELD
 SHARPNESS  : L/M/H

 MENU2      [>]
```

6 Switch 1 to green by pressing ⍃ or ⍄ buttons.



```
MENU1              COLOR 00

 PRINT QTY  : 001
▶MULTI PIX  : 1/4/9
 SEPARATE     • • • •
 INPUT SEL    V/S-VIDEO/R
 FRM/FLD      FRAME/FIELD
 SHARPNESS    L/M/H

 MENU2        [>]
```

1 is switched to green.

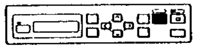
Anything printed out subsequently will be a full-size image.

To return to the regular screen:
Press the MENU button.

7 Play back the video images. (to be continued)

Continued

8 When the image you want to print is on the screen, press the MEMORY IN button to store it in memory.

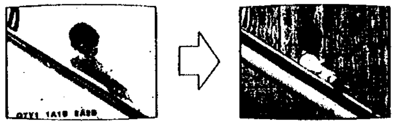


The stored image appears on the screen.

When the stored image is blurred

A quickly moving image may be blurred when it is printed. If this happens, switch the memory mode from frame to field to eliminate the blur. However, since printing in field mode has lower resolution than in the frame mode, the print quality will be slightly lower. (For details, see page 62).

The blur is eliminated.



Frame mode

Field mode

To change the image to print

① Press the SOURCE/MEMORY button to return to the playback image.

② Press the MEMORY IN button again to store a new image in memory. The previous image is replaced with the new one.

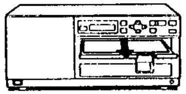
9 Press the PRINT button.

It takes about one minute to print one page.

Blinks during the printing process.
Printing starts - yellow - magenta -cyan - printing ends.

Note

The paper is ejected over the print tray at several stages during the printing process. Do not handle the paper until printing has been completed.



When it is complete, the printout is pushed forward.

To stop printing before completion

Press the STOP button. Printing ends immediately and the paper is ejected to the print tray.

When you want to see an image that is hidden below a screen message

You can erase the screen messages on the video monitor. For details, see page 74.

To store other images in memory during printing

You cannot store an image in memory where the image which you are printing is stored. Select another memory page and store the next image in that memory page.

① Select another memory page by using the MEMORY PAGE button.

② When the image you want to print is on the monitor, press the MEMORY IN button to store it in memory.

When the printer does not print

- Whenever an error message is displayed on the video monitor, the printer will not print. To correct the error, see "Error Messages" on page 84.
- When you turn the power off, the image stored in memory is erased. To subsequently print an image, you must store it again.

Notes on preserving your printouts

- Do not place a printout under a clear vinyl desk mat or in a clear plastic file that contains a plasticizer. Also, avoid leaving plastic erasers on top of the prints. The ink will stick to the plastic surface.
- Be sure not to leave the printed surface of an OHP transparency pressed against anything (even objects that are not plastic or vinyl). The ink may come off onto the other surface.
- To avoid degradation of the color do not place the prints in locations subject to:
  - direct sunlight
  - high temperatures
  - high humidity

Making more than one copy of an image

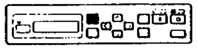
You can print up to 100 copies of a stored image. Do the following before printing or while printing the first copy. You can change the designated number of copies at any time before printing has ended.

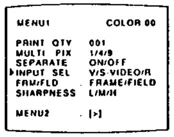
When controlling the printer with the supplied remote control unit
You can designate or change the number of copies on the regular screen, instead of the menu screen, by using the PRINT QTY + and – buttons. You can designate or change the number even during printing.

Display of the print quantity
The number of copies is displayed on moniter screen and printer window display as follows.

Qty	Monitor display	Printer window display
1	QTY1	Q1
10	Q010	10
99	Q099	99
100	Q100	00

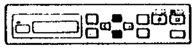
1 Press the MENU button.

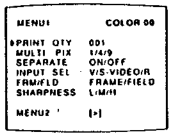



MENU1 COLOR 00
PRINT QTY 001
MULTI PIX 1/4/9
SEPARATE ON/OFF
▶INPUT SEL V/S-VIDEO/R
FRM/FLD FRAME/FIELD
SHARPNESS L/M/H
MENU2 [>]

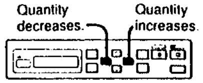
MENU 1 appears.

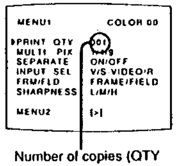
2 Move the cursor ▶ to "PRINT QTY" by pressing the ☐ or ☐ buttons.




MENU1 COLOR 00
▶PRINT QTY 001
MULTI PIX 1/4/9
SEPARATE ON/OFF
INPUT SEL V/S-VIDEO/R
FRM/FLD FRAME/FIELD
SHARPNESS L/M/H
MENU2 [>]

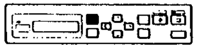
3 Set the number of copies by pressing the ☐ or ☐ buttons.


Quantity decreases.
Quantity increases.

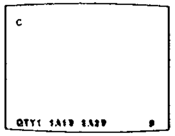

MENU1 COLOR 00
▶PRINT QTY 001
MULTI PIX 1/4/9
SEPARATE ON/OFF
INPUT SEL V/S-VIDEO/R
FRM/FLD FRAME/FIELD
SHARPNESS L/M/H
MENU2 [>]

Number of copies (QTY stands for quantity)

4 Press the MENU button to return to the regular screen.



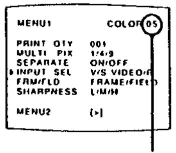
Regular screen



The printer prints out the same image until the ribbon or the paper has been exhausted.

When the paper is exhausted during printing
Fill the tray with paper and press the PRINT button again.

To check how much ink ribbon remains
Press the MENU button.


MENU1 COLOR 05
PRINT QTY 001
MULTI PIX 1/4/9
SEPARATE ON/OFF
▶INPUT SEL V/S VIDEO/R
FRM/FLD FRAME/FIELD
SHARPNESS L/M/H
MENU2 [>]

Indicates the remaining quantity.

Notes on remaining ribbon

- The video monitor displays the remaining number of printouts available from the ribbon last used for printing, even when a new ribbon is inserted. After the printer makes the first print out, the remaining ribbon of the new ribbon is displayed.
- The printer does not recognize any change when a ribbon is replaced by another of the same type (for example, two color ribbons) and continues subtracting from the original count as prints are made. The correct number of remaining printouts is not displayed. The print function, however, is unaffected.

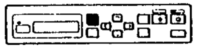
1-7. ADJUSTING PRINT QUALITY AND COLOR

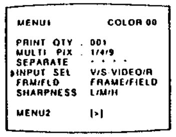
This section explains how to adjust and store a picture's sharpness, color intensity and contrast.

Adjusting the sharpness

You can set the sharpness of the printout to one of three levels: L (Low), M (Medium) or H (High). A printout appears softer or sharper depending on the definition of the subject outline. Change this setting before printing as necessary. The new setting remains valid until you enter a new setting - even if you turn the power off.

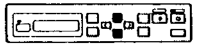
1 **Press the MENU button.**

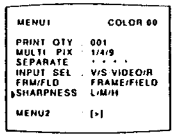




```
MENU1              COLOR 00

PRINT QTY  . 001
MULTI  PIX . 1/4/9
SEPARATE     • • • •
▶INPUT SEL   V/S VIDEO/R
FRM/FLD      FRAME/FIELD
SHARPNESS    L/M/H

MENU2        [>]
```

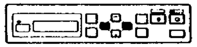
2 **Move the cursor ▶ to SHARPNESS by pressing the △ or ▽ buttons.**

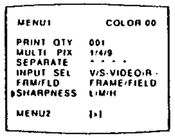




```
MENU1              COLOR 00

PRINT QTY  . 001
MULTI  PIX · 1/4/9
SEPARATE     • • • •
INPUT SEL  . V/S VIDEO/R
FRM/FLD      FRAME/FIELD
▶SHARPNESS   L/M/H

MENU2      · [>]
```

3 **Switch the letter corresponding to the desired sharpness to green by pressing the ◁ or ▷ buttons.**





```
MENU1              COLOR 00

PRINT QTY    001
MULTI  PIX   1/4/9
SEPARATE     • • • •
INPUT SEL    V/S·VIDEO·R ·
FRM/FLD      FRAME/FIELD
▶SHARPNESS   L/M/H

MENU2        [>]
```

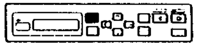
L (Low): soft outline
M (Medium): normal outline
H (High): sharp outline

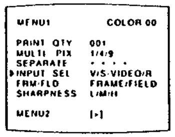
Note
The image on the video monitor does not reflect any change in the sharpness setting.

Displaying the COLOR ADJUST menu screen

1 **Press the SOURCE/MEMORY button to display the image stored in memory. (You can also adjust the input image.)**

2 **Press the MENU button.**

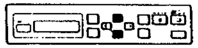


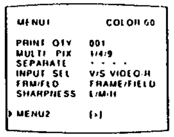


```
MENU1              COLOR 00

PRINT QTY    001
MULTI  PIX   1/4/9
SEPARATE     • • • •
▶INPUT SEL   V/S·VIDEO/R
FRM/FLD      FRAME/FIELD
SHARPNESS    L/M/H

MENU2        [>]
```

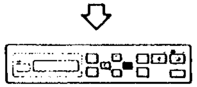
The MENU 1 screen appears.

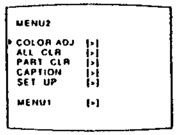
3 **Move the cursor ▶ to MENU 2 by pressing the △ or ▽ buttons, then press the ▷ button.**





```
MENU1              COLOR 00

PRINT QTY    001
MULTI  PIX   1/4/9
SEPARATE     • • • •
INPUT SEL    V/S VIDEO·R
FRM/FLD      FRAME/FIELD
SHARPNESS    L/M/H

▶ MENU2      [>]
```

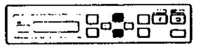


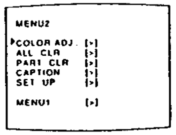


```
MENU2

▶ COLOR ADJ  [>]
ALL  CLR     [>]
PART  CLR    [>]
CAPTION      [>]
SET  UP      [>]

MENU1        [>]
```

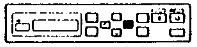
The MENU 2 screen appears.

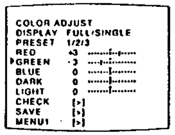
4 **Move the cursor ▶ to COLOR ADJ by pressing the △ or ▽ buttons, then press the ▷ button.**





```
MENU2

▶COLOR ADJ  [>]
 ALL CLR    [>]
 PART CLR   [>]
 CAPTION    [>]
 SET UP     [>]

 MENU1      [>]
```

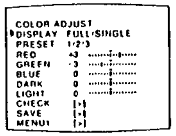




```
COLOR ADJUST
DISPLAY  FULL/SINGLE
PRESET   1/2/3
RED      +3
▶GREEN   -3
BLUE      0
DARK      0
LIGHT     0
CHECK    [>]
SAVE     [>]
MENU1    [>]
```

The COLOR ADJUST menu appears.

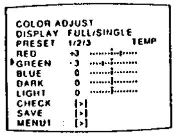
How to read the COLOR ADJUST menu
This part outlines each item of the COLOR ADJUST menu. Read it thoroughly before adjusting the color for the first time.



```
COLOR ADJUST
▶DISPLAY  FULL/SINGLE
PRESET   1/2/3
RED      +3
GREEN    -3
BLUE      0
DARK      0
LIGHT     0
CHECK    [>]
SAVE     [>]
MENU1    [>]
```

DISPLAY
Selecting the method of displaying the color adjusting screen

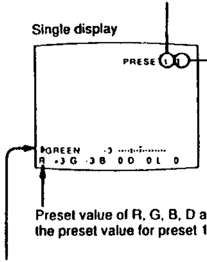
Full display



```
COLOR ADJUST
DISPLAY  FULL/SINGLE
PRESET   1/2/3        TEMP
RED      +3
▶GREEN   -3
BLUE      0
DARK      0
LIGHT     0
CHECK    [>]
SAVE     [>]
MENU1    [>]
```

Preset number

Single display



```
PRESE 1 T
▶GREEN    -3
R +3 G -3 B  0 D  0 L  0
```

Indicates that the preset value is temporarily changed. TEMP disappears when you save the set value. (TEMP stands for temporary)

Preset value of R, G, B, D and L (this example shows the preset value for preset 1)

Displays the item under the presetting process and the value lighting in green on the line to which the cursor is positioned.

PRESET
Three presettings are available. Select one of these three. The stored values for color intensity and picture contrast are called from memory and appear against each item. TEMP appears at the right of this line when you change the presetting to indicate that the values only temporary.

RED/GREEN/BLUE
Adjusting the color intensity (see page 42)

DARK/LIGHT
Adjusting the picture contrast (see page 44)

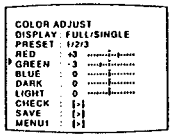
CHECK
Used to erase the menu screen when it is difficult to check the adjusted color. Move the cursor ▶ to CHECK. The menu screen is not displayed for as long as you keep the ▷ button held down. We recommend that you check the set color before storing it.

SAVE
Storing the set value for the color in the selected presetting number.

MENU 1
Returning to MENU 1

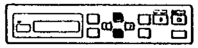
Adjusting the color intensity
Adjust a printout's color intensity by separately adjusting the r (red), g (green) and b (blue) parts of the image while it is displayed on the video monitor.

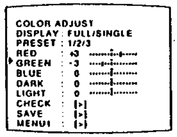
1 **Display the COLOR ADJUST menu screen.**



```
COLOR ADJUST
DISPLAY : FULL/SINGLE
PRESET  : 1/2/3
RED     : +3
▶GREEN  : -3
BLUE    :  0
DARK    :  0
LIGHT   :  0
CHECK   : [>]
SAVE    : [>]
MENU1   : [>]
```

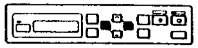
2 **Move the cursor ▶ to one of three color components; R, G and B by pressing the △ or ▽ buttons.**

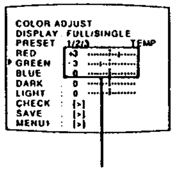




```
COLOR ADJUST
DISPLAY : FULL/SINGLE
PRESET  : 1/2/3
RED     : +3
▶GREEN  : -3
BLUE    :  0
DARK    :  0
LIGHT   :  0
CHECK   : [>]
SAVE    : [>]
MENU1   : [>]
```

3 **Adjust the intensity of the selected color component by pressing the ◁ or ▷ buttons.**





```
COLOR ADJUST
DISPLAY   FULL/SINGLE
PRESET    1/2/3       TEMP
RED       +3
▶GREEN    -3
BLUE       0
DARK       0
LIGHT      0
CHECK    : [>]
SAVE     : [>]
MENU1    : [>]
```

Color component is divided into 16 scales from −7 to +8, indicated by a value and graph. 0 and the center of the graph correspond to the standard color.

The intensity increases in the + direction and decreases in the − direction.

By pressing the ◁ and ▷ buttons together, you can quickly reset the value to 0 (standard value).
Pressing the ◁ and ▷ buttons on the supplied remote control unit does not allow you to reset the value to 0.

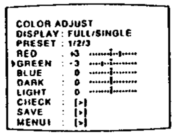
Note
This set value is only temporary. This setting is cleared when you turn the printer off.

When it is difficult to check the settings because of the display on the monitor
To check your settings, you can erase the display using either of the following two methods.

- Select the SINGLE screen.
  Move the cursor ▶ to DISPLAY and switch SINGLE of FULL/SINGLE to green by pressing the ◁ or ▷ buttons.
  You can select the item to be adjusted by pressing the △ or ▽ button on the SINGLE screen.
- Erasing the display temporarily
  Move the cursor ▶ to CHECK and press the ▷ button. For as long as you keep the ▷ button held down, the display does not appear on the screen.

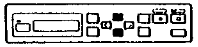
Adjusting the picture contrast
Adjust the picture contrast of a print by adjusting the extremes of dark and light of the image with the COLOR ADJUST menu screen, while viewing the image on the video monitor.

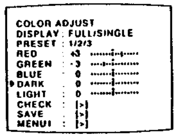
1 Display the COLOR ADJUST menu screen.



```
COLOR ADJUST
DISPLAY : FULL/SINGLE
PRESET  : 1/2/3
RED     : +3
▶GREEN  : -3
BLUE    :  0
DARK    :  0
LIGHT   :  0
CHECK   : [>]
SAVE    : [>]
MENU1   : [>]
```

2 Move the cursor ▶ to either DARK or LIGHT by pressing the △ or ▽ buttons.

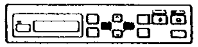


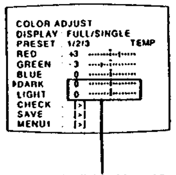


```
COLOR ADJUST
DISPLAY : FULL/SINGLE
PRESET  : 1/2/3
RED     : +3
GREEN   : -3
BLUE    :  0
▶DARK   :  0
LIGHT   :  0
CHECK   : [>]
SAVE    : [>]
MENU1   : [>]
```

DARK: Adjusts the dark area of an image
LIGHT: Adjusts the light area of an image

3 Adjust the selected picture contrast by pressing the ◁ or ▷ buttons.





```
COLOR ADJUST
DISPLAY  FULL/SINGLE
PRESET   1/2/3          TEMP
RED     +3
GREEN   -3
BLUE     0
▶DARK    0
LIGHT    0
CHECK   [>]
SAVE    [>]
MENU1   [>]
```

Contrast is divided into 16 scales from −7 to +8, and indicated by a set value and graph. 0 and the center of the graph correspond to the standard contrast.
The contrast in the dark area or light area is strengthened in the + direction and weakened in the − direction.

By pressing the ◁ and ▷ buttons together, you can quickly reset the value to 0 (standard value).
Pressing the ◁ and ▷ buttons on the supplied remote control unit does not allow you to reset the value to 0.

Note
This set value is only temporary. This setting is cleared when you turn the printer off.

When it is difficult to check your settings because of the display on the monitor.
To check your settings, you can erase the display using either of the following two methods.

- Select the SINGLE screen.
  Move the cursor ▶ to DISPLAY and switch SINGLE of FULL/SINGLE to green by pressing the [◁] or [▷] buttons.
  You can select the item to be adjusted by pressing the [△] or [▽] button on the SINGLE screen.
- Erasing the display temporarily
  Move the cursor ▶ to CHECK and press the [▷] button. For as long as you keep the [▷] button held down, the display does not appear on the screen.

When the image in a light area of the print does not appear
Select LIGHT and reduce the set value by moving the green scale to the left.

If you still cannot output a good printout
Set the GAIN AUTO/MANUAL selector to MANUAL and, while watching the image on the video monitor, turn the GAIN control counterclockwise until an image in a light area can be seen.

When the image in a dark area of the print does not appear
Select DARK and reduce the set value by moving the green scale to the left.

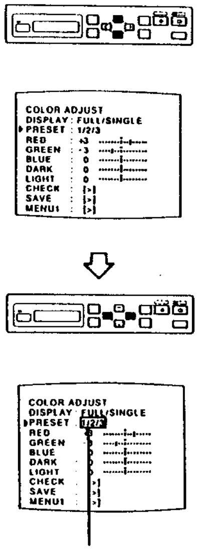
If you still cannot output a good printout
Set the GAIN AUTO/MANUAL selector to MANUAL and, while watching the image on the video monitor, turn the GAIN control clockwise until an image in a dark area can be seen.

Storing the new picture adjustments in a presetting

You can store up to three presettings. The printer will retain these even if you turn the power off.
This is useful when you are using more than one video player, each of a different quality, and when you want to print images with different color qualities and picture contrasts.

1 **Display the image to adjust.**

2 **Move the cursor ▶ to PRESET by pressing the [△] or [▽] buttons. Switch the number corresponding to the preset to adjust to green by pressing the [◁] or [▷] buttons.**



```
COLOR ADJUST
DISPLAY : FULL/SINGLE
▶PRESET : 1/2/3
RED     : +3
GREEN   : -3
BLUE    :  0
DARK    :  0
LIGHT   :  0
CHECK   : [>]
SAVE    : [>]
MENU1   : [>]
```

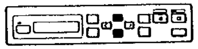
```
COLOR ADJUST
DISPLAY : FULL/SINGLE
▶PRESET : 1/2/3
RED
GREEN
BLUE
DARK
LIGHT
CHECK   : >]
SAVE    : >]
MENU1   : >]
```

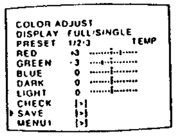
The selected presetting number is switched green.

3 **Adjust the color intensity and the picture contrast. (See pages 42 to 45.)**

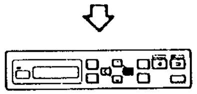
Note
After you complete the color adjusting, move the cursor ▶ to CHECK and keep the [▷] button held down to check the adjusted color.

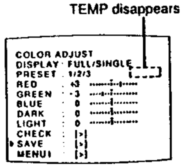
4 **Move the cursor ▶ to SAVE by pressing the ⍓ or ⍌ buttons, then press the ⍄ button.**





```
COLOR ADJUST
DISPLAY  FULL/SINGLE
PRESET   1/2/3              TEMP
RED       +3
GREEN     -3
BLUE       0
DARK       0
LIGHT      0
CHECK     [>]
▶SAVE     [>]
MENU1     [>]
```





TEMP disappears

```
COLOR ADJUST
DISPLAY : FULL/SINGLE
PRESET  : 1/2/3
RED     : +3
GREEN   : -3
BLUE    :  0
DARK    :  0
LIGHT   :  0
CHECK   : [>]
▶SAVE   : [>]
MENU1   : [>]
```

The setting made in step 3 is stored.

To call a stored presetting
Select PRESET from the COLOR ADJUST menu and switch the number corresponding to desired presetting to green.

TEMP displayed in step 3
If you change the settings for a called preset, TEMP appears. This TEMP disappears if you store the setting which you changed, in step 4. You can also print while TEMP is displayed. The printer prints with the temporarily set value, however. By turning the printer off, this temporarily set value is cleared and the settings are reset to those stored before you changed the settings.

1-8. USING THE MEMORY

Frame mode and field mode

This section explains how to use and set the memory.
To print an image, you must first store it in memory. Although the memory usually stores a single image, you can set it to store two full-size images having lower resolutions.
As described above, one memory consists of two fields, 1A and 1B. You can use these two fields together or separately. The memory use status is called the "memory mode." There are two memory modes as follows.

- Frame mode
  Two field memories are used together to store one image.
- Field mode
  One field memory, either 1A or 1B, is used to store one field of an image.

The Sony UP-5100 has one memory which consists of two memory fields.

When you select FRAME mode to use two fields to store one image, 1A 1B appears on the video monitor. When you select FIELD mode where you use one field to store one image, 1A 1B appears.

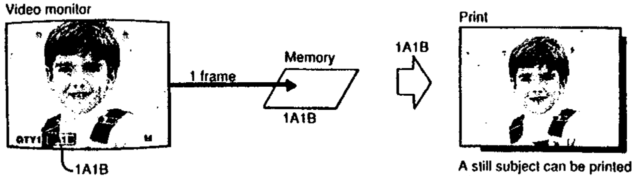
The Sony UP-5150 has two memories.

When you select the FRAME mode, 1A1B 2A2B appears on the video monitor. When you select the FIELD mode, 1A 1B 2A 2B appears.

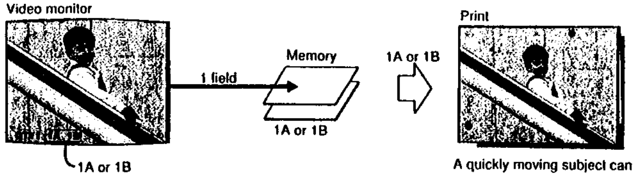
Note
This section explains the use of the memory using the UP-5100 (which has one memory) as an example. The principle is the same for the two-memory UP-5150.

Frame mode and field mode of a full image and reduced images

Full image


Video monitor
1A1B
1 frame
Memory
1A1B
1A1B
Print

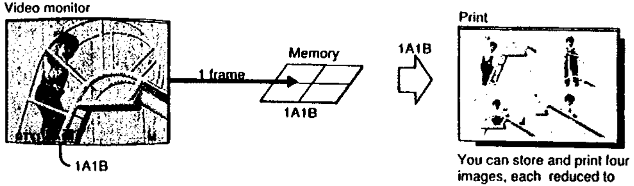
A still subject can be printed with high resolution.


Video monitor
1A or 1B
1 field
Memory
1A or 1B
1A or 1B
Print

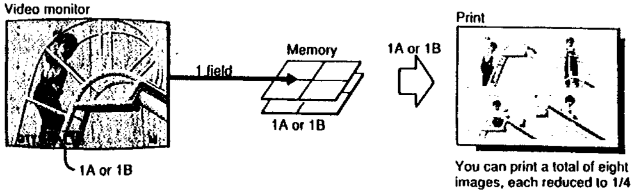
A quickly moving subject can be printed without blurring. You can store two images using 1A and 1B separately.

Four reduced images

You can make up to nine reduced images. However, this section explains reduced images using four reduced images as an example.


Video monitor
1A1B
1 frame
Memory
1A1B
1A1B
Print

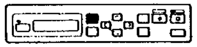
You can store and print four images, each reduced to 1/4 size.

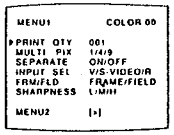

Video monitor
1A or 1B
1 field
Memory
1A or 1B
1A or 1B
Print

You can print a total of eight images, each reduced to 1/4 size, by using 1A and 1B. (The resolution becomes low.)

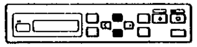
Setting the memory mode

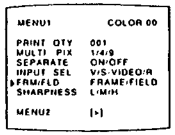
1 **Press the MENU button to display the MENU 1 screen.**



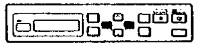

MENU1 COLOR 00
▶PRINT QTY 001
MULTI PIX 1/4/9
SEPARATE ON/OFF
INPUT SEL V/S-VIDEO/R
FRM/FLD FRAME/FIELD
SHARPNESS L/M/H
MENU2 [▷]

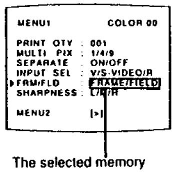
2 **Move the cursor ▶ to FRM/FLD by pressing the △ or ▽ buttons.**




MENU1 COLOR 00
PRINT QTY 001
MULTI PIX 1/4/9
SEPARATE ON/OFF
INPUT SEL V/S-VIDEO/R
▶FRM/FLD FRAME/FIELD
SHARPNESS L/M/H
MENU2 [▷]

3 **Select either of the two memory modes by pressing the ◁ or ▷ buttons.**



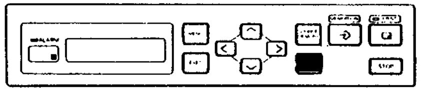

MENU1 COLOR 00
PRINT QTY : 001
MULTI PIX : 1/4/9
SEPARATE : ON/OFF
INPUT SEL : V/S-VIDEO/R
▶FRM/FLD : FRAME/FIELD
SHARPNESS : L/M/H
MENU2 [▷]

The selected memory mode is switched to green.

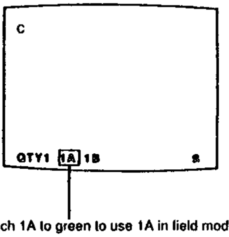
FRAME: Usually, we recommend that you print in this mode.
FIELD: Select this mode to reduce the blurring when you print a quickly moving.

Selecting the memory page

The memory used to store an image is called a memory page. Even when we use two memory fields in the frame mode to store one image, we call this 1A1B one memory page.
Switch the color of the memory page, to be used to store the image, to green, by pressing the MEMORY PAGE button.



Video monitor



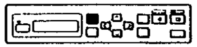
Switch 1A to green to use 1A in field mode.

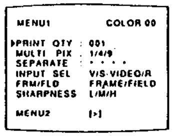
This section explains how to make prints by combining images as follows; Four reduced images, nine reduced images, print with an insert

Making a printout with four images or nine images

By selecting the appropriate memory setting, you can make a multiple-image print with four reduced images or nine reduced images. You can also make a multiple-image print with white divisions.

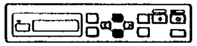
1 **Press the MENU button to display the MENU 1 screen.**

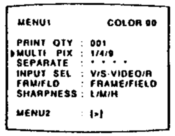




```
MENU1                COLOR 00
▶PRINT QTY  : 001
 MULTI PIX  . 1/4/9
 SEPARATE   : • • • •
 INPUT SEL    V/S-VIDEO/R
 FRM/FLD      FRAME/FIELD
 SHARPNESS    L/M/H

 MENU2        [>]
```

2 **Move the cursor ▶ to MULTI PIX by pressing the [Λ] or [V] buttons.**

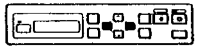


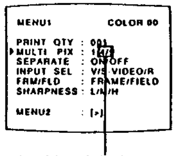


```
MENU1                COLOR 00
 PRINT QTY  : 001
▶MULTI PIX  : 1/4/9
 SEPARATE   : • • • •
 INPUT SEL  : V/S-VIDEO/R
 FRM/FLD    : FRAME/FIELD
 SHARPNESS  : L/M/H

 MENU2      : [>]
```

To make a multiple-image printout with four reduced images;
Switch the number 4 to green by pressing the [<] or [>] buttons.

To make a multiple-image printout with nine reduced images;
Switch the number 9 to green by pressing the [<] or [>] buttons.

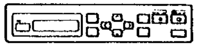


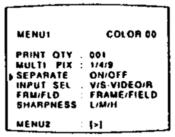


```
MENU1                COLOR 00
 PRINT QTY  : 001
▶MULTI PIX  : 1/4/9
 SEPARATE   : ON/OFF
 INPUT SEL  : V/S-VIDEO/R
 FRM/FLD    : FRAME/FIELD
 SHARPNESS  : L/M/H

 MENU2      : [>]
```

4 or 9 is switched to green.

3 **Move the cursor ▶ to SEPARATE by pressing the [V] button.**

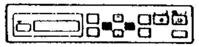


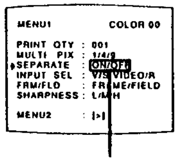


```
MENU1                COLOR 00
 PRINT QTY  . 001
 MULTI PIX  : 1/4/9
▶SEPARATE     ON/OFF
 INPUT SEL  . V/S-VIDEO/R
 FRM/FLD    : FRAME/FIELD
 SHARPNESS    L/M/H

 MENU2      : [>]
```

To make a multiple print with divisions
Switch ON to green by pressing the [<] or [>] buttons.

To make a multiple print without divisions
Switch OFF to green by pressing the [<] or [>] buttons.

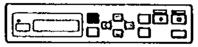


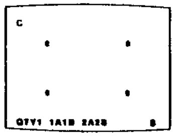


```
MENU1                COLOR 00
 PRINT QTY  : 001
 MULTI PIX  : 1/4/9
▶SEPARATE   : ON/OFF
 INPUT SEL  : V/S-VIDEO/R
 FRM/FLD    : FRAME/FIELD
 SHARPNESS  : L/M/H

 MENU2      : [>]
```

ON or OFF is switched to green.

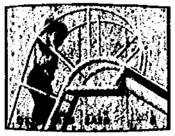
4 **Press the MENU button to return to the regular screen.**





5 **Play back the video images.**

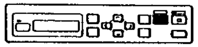
This shows that four-image printing was selected in step 2.

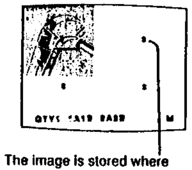


The green star * indicates where the image will be stored.

6 **When the image you want to print appears on the monitor, press the MEMORY IN button to store the image in the memory.**

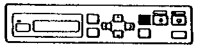
The image stored in memory appears on the video monitor.



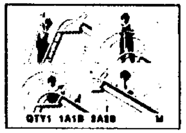


The image is stored where there the green star * is positioned. Then, the green star * moves to the next position.

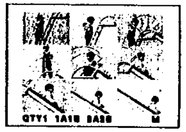
7 **Press the SOURCE/MEMORY button to return to the playback picture.**



8 **Repeat steps 6 and 7 to store four or nine reduced images.**



Four-image screen



Nine-image screen

When you want to replace a stored image
Move the green star * to the image you want to delete by pressing the [<] or [>] buttons and store the new image.

9 **Press the PRINT button to make prints.**

Notes

- If there is already an image under the green star *, it will be replaced by the new image.
- The green star * automatically moves to the next image whenever you re-peat steps 6 and 7. To skip a previously stored image and keep it in memory, move the green star * by pressing the [<] or [>] buttons.
- The initial setting for printing with or without divisions is set to ON (with divisions). When you use this printer for the first time and make a printout without divisions, change the setting to OFF.
- When the power is turned on again, the setting is reset to ON anytime.

Making a printout with an insert

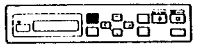
You can make printouts with an insert by using four- or nine-image printing.

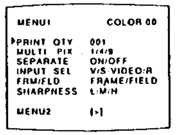
Example:
Making printouts with one of four reduced images inserted

1 **Play back the video image and press the MEMORY IN button to store the background image (full-size).**

Note
If your printer is set to print four or nine reduced images, change the setting to fullsize before printing.

2 **Press the MENU button to display the MENU 1 screen.**





```
MENU1                COLOR 00

▶PRINT  QTY     001
 MULTI  PIX     1/4/9
 SEPARATE       ON/OFF
 INPUT  SEL     V/S-VIDEO/R
 FRM/FLD        FRAME/FIELD
 SHARPNESS      L/M/H

 MENU2          (>)
```

3 **Move the cursor ► to MULTI PIX by pressing the [△] or [▽] buttons and switch the number 4 to green by pressing the [◁] or [▷] buttons.**

4 **Move the cursor ► to SEPARATE by pressing the [△] or [▽] buttons.**

Then switch OFF to green by pressing the [◁] or [▷] buttons.

Note
If you print with SEPARATE set to ON, an image is printed with white divisions.

5 **Press the MENU button to return to the regular screen.**

6 **Move the green star * to the point where the reduced image is to be inserted by using the [◁] or [▷] buttons.**

7 **Play back the image. Press the MEMORY IN button when the image you want to insert appears.**

The insert image is stored in the memory page selected in Step 6.

8 **Press the PRINT button to make a printout.**

Note
You cannot print an image stored in a different memory.

Storing more than one image

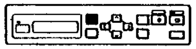
You can store more than one image in memory.

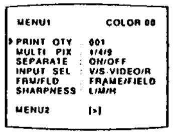
Memory mode	Number of images you can store (for the UP-5100)	Number of images you can store (for the UP-5150)
Frame mode	One[1]	Two[2]
Field mode	Two[3]	Four[4]

1) This is for full-image printing. Four for four-image-printing and nine for nine-image-printing
2) This is for full-image printing. Eight for four-image-printing and 18 for nine-image-printing
3) This is for full-image printing. Eight for four-image-printing and 18 for nine-image printing
4) This is for full-image printing. 16 for four-image-printing and 36 for nine-image printing

Example:
When you are using the UP-5100 printer, you store two images in the field mode

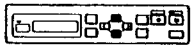
1 **Press the MENU button to display the MENU 1 screen.**

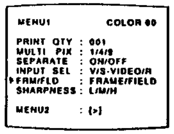




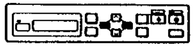
```
MENU1              COLOR 00

▶PRINT  QTY  .  001
 MULTI  PIX  .  1/4/9
 SEPARATE    :  ON/OFF
 INPUT  SEL  :  V/S-VIDEO/R
 FRM/FLD     .  FRAME/FIELD
 SHARPNESS   .  L/M/H

 MENU2          [>]
```

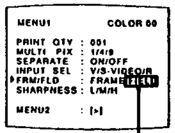
2 **Move the cursor ▶ to FRM/FLD by pressing the ∧ or ∨ buttons, then select the memory mode by pressing the < or > buttons.**





```
MENU1              COLOR 00

 PRINT  QTY  :  001
 MULTI  PIX  :  1/4/9
 SEPARATE    :  ON/OFF
 INPUT  SEL  :  V/S-VIDEO/R
▶FRM/FLD     :  FRAME/FIELD
 SHARPNESS   :  L/M/H

 MENU2       :  [>]
```

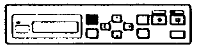


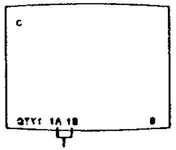


```
MENU1              COLOR 00

 PRINT  QTY  :  001
 MULTI  PIX  :  1/4/9
 SEPARATE    :  ON/OFF
 INPUT  SEL  :  V/S-VIDEO/R
▶FRM/FLD     :  FRAME/FIELD
 SHARPNESS   :  L/M/H

 MENU2       :  [>]
```

In this example, you select FIELD. Thus, switch FIELD to green.

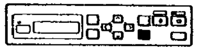
3 **Press the MENU button to return to the regular screen.**

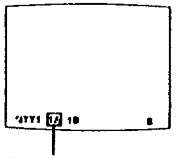




Two field

4 **Select the memory page by pressing the MEMORY PAGE button.**



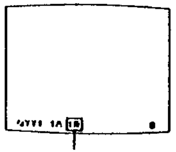


Selected memory is switched to green.

5 **Play back the image. Press the MEMORY IN button to store the image in memory.**

The image is stored in 1A.

6 **Select other memory page for storing another image by pressing the MEMORY PAGE button.**



Selected memory is switched to green.

7 **Play back the image. Press the MEMORY IN button to store the desired image in the memory.**

The image is stored in 1B.

8 **Select the memory page where the image you want to print is stored by using the MEMORY PAGE button.**

Press the PRINT button to make a printout.

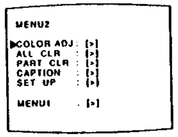
The image in 1B is printed

Deleting an image stored in memory

1 **Select the memory page containing the image you want to delete by pressing the MEMORY PAGE button.**

2 **Press the MENU button to display the MENU 1 screen. Move the cursor ▶ to MENU 2 by pressing the ⋀ or ⋁ buttons, then press the ⊳ button.**

The MENU 2 screen appears.


MENU2

▶COLOR ADJ : [>]
ALL CLR : [>]
PART CLR : [>]
CAPTION : [>]
SET UP : [>]

MENU1 . [>]

3 **Move the cursor ▶ to ALL CLR or PART CLR, then press the ⊳ button.**

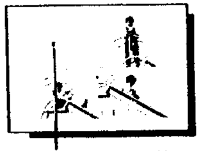
To delete the full image
Move the cursor to ALL CLR.
To delete a reduced image
Move the cursor to PART CLR.

Note
When you move the cursor ▶ to PART CLR, the reduced-image screen selected at MULTI PIX on MENU 1 appears. If you want to delete the other reduced images, return to the MENU 1 screen and change the MULTI PIX settings.

4 **Press the EXEC button.**

The screen or location from which the image was deleted becomes whitish.

To delete the reduced images
Move the green star * to the location where there is the image you want to delete by pressing the ⊲ or ⊳ buttons, then press the EXEC button.


The image in this position is cleared.

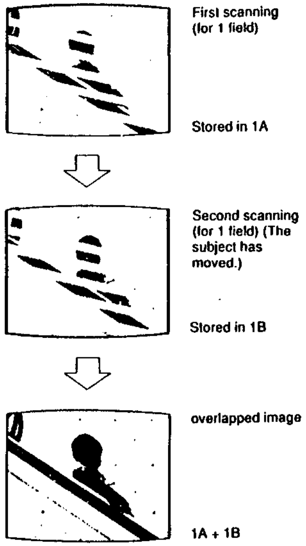
When you are deleting reduced images, repeat step 4 until you have to delete all the images you want to delete.

1-9. MAKING PRINTS WITH CAPTION

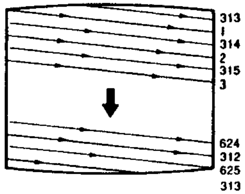
Making printouts in field mode

You can change the memory mode from frame to field to print an image stored in the frame mode. When a printout is blurred in frame mode, switch to field mode and print the image. You can thus eliminate blurring.

Why does setting the memory to FIELD eliminate blurring?
A monitor displays a video image by sending electron beams across its screen; first every other line, then returning to the top and filling in the spaces to the bottom. Each of the two runs from top to bottom is a field. Together they make up a frame.


First scanning (for 1 field)
Stored in 1A
Second scanning (for 1 field) (The subject has moved.)
Stored in 1B
overlapped image
1A + 1B

Video cameras record images in these half-frames, or fields. The example below illustrates how a quickly moving subject is recorded in two parts - once from top to bottom with alternate gaps, and then again from the top to the bottom filling in every other line. If the subject moves within 1/60th of a second from the first tracking, the second tracking will be slightly offset. When 1A and 1B, each corresponding to one of the two fields of the stored image, are overlapped in the frame setting, 1A1B, the image will appear jittery on the monitor and blurred when printed. Separated into its two fields, however, a quickly moving subject will not be blurred.

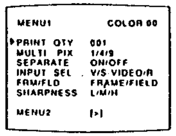


A field is drawn in 1/60th of a second. A frame is completed in 1/30th of a second.

You can enter a caption, such a data or comments, in small characters below the image. You can input 60 characters. When you use a computer connected to the RS-232C connector, you can input up to 320 characters (two lines each for the top and bottom of the screen, four lines in total) in the NARROW size and NORMAL size mode and 160 characters (one line each for the top and bottom, two lines in total) in the WIDE size mode.
This section explains how to enter a caption. The order is as follows. • Displaying the CAPTION input screen • Entering a caption • Making printouts with a caption

Displaying the CAPTION input screen

1 Press the MENU button to display the MENU 1 screen.



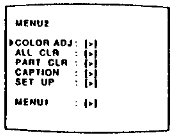
MENU1 COLOR 00

▶PRINT QTY 001
MULTI PIX 1/4/9
SEPARATE ON/OFF
INPUT SEL V/S VIDEO/R
FRM/FLD FRAME/FIELD
SHARPNESS L/M/H

MENU2 [>]

2 Move the cursor ► to MENU 2 by pressing the ▽ buttons, then press the ▷ button.

The MENU 2 screen appears.



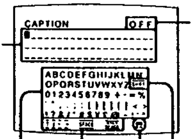
MENU2

▶COLOR ADJ : [>]
ALL CLR : [>]
PART CLR : [>]
CAPTION : [>]
SET UP : [>]

MENU1 : [>]

3 Move the cursor ► to CAPTION, then press the ▷ button.

The CAPTION input screen appears.



Character display area
This part appears in green when ON is displayed, and in white when OFF is displayed.

ON is displayed when printing with a caption and OFF when printing without a caption. (The factory-setting is OFF.)

Character entry area
The cursor is positioned to the letter or symbol in green.

By switching SHIFT to green and pressing EXEC, capital letters are changed to lower-case letters, or lower-case letters are switched to capital letters.

Symbols and words with = are used to enter a caption.

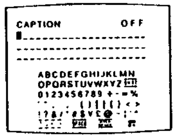
Selects whether to print with a caption

For the CAPTION input display, the video monitor and the printer display window differ as shown in the table. Their meanings, however, are the same.

Monitor display	Printer display
SPACE	SP
BACK SPACE	BS
OFF	OFF
ON	ON
SHIFT	SF sf

Entering a caption

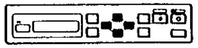
1 **Display the CAPTION input display.**

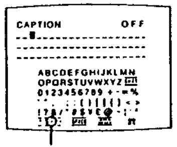


2 **Move the cursor ■ to where you want to enter in the character display area.**

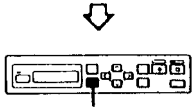
To move the cursor
Switch the arrow of the direction where you want to move to green. Then press the EXEC button.
The ■ moves in the green arrow direction whenever you press the EXEC button.

Example: To move the cursor ■ to the left by two.

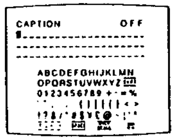




Switch ← to green

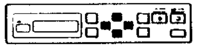


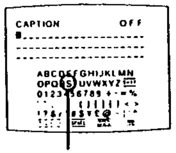
Press EXEC twice



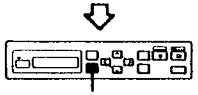
3 **Switch the character you want to enter to green by pressing the △ ▽ ◁ or ▷ buttons, then press the EXEC button.**

Example: To enter S.

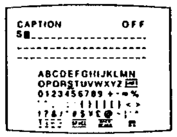




Switch S to green



Press EXEC



The selected character appears in blinking white ■.
SPACE: one space

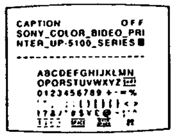
4 **Repeat steps 2 and 3 to enter the remaining characters of a caption.**

Entered characters are stored and kept even after you turn off the power.

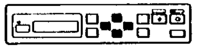
Note
When the character display area is displayed in white, the setting for CAPTION is OFF, so that you can not add a caption to a printout. See "Making printouts with a caption" on page 67.

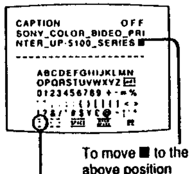
When you enter a wrong character
Switch the BACK SPACE to green by pressing the △ ▽ ◁ or ▷ buttons, then press the EXEC button. The character to the left of ■ will be deleted.

When replacing a previously entered caption
Example: To replace B of BIDEO with V.


CAPTION OFF
SONY_COLOR_BIDEO_PRI
NTER_UP-5100_SERIES■
ABCDEFGHIJKLMN
OPQRSTUVWXYZ

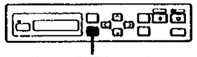
1 Switch the up arrow (↑) to green by pressing the [Λ] [V] [<] or [>] buttons, then press the EXEC button.



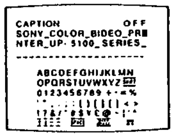

CAPTION OFF
SONY_COLOR_BIDEO_PRI
NTER_UP-5100_SERIES■
ABCDEFGHIJKLMN
OPQRSTUVWXYZ
0123456789

To move ■ to the above position

Move the cursor to ↑.

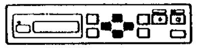


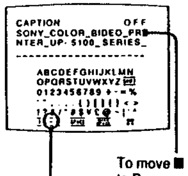
Press EXEC one time.


CAPTION OFF
SONY_COLOR_BIDEO_PR■
NTER_UP-5100_SERIES_
ABCDEFGHIJKLMN
OPQRSTUVWXYZ
0123456789

The white cursor ■ move to the above position.

2 Switch the left arrow to green and press the EXEC button until the white cursor ■ moves to the character you want to replace.

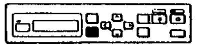


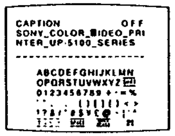

CAPTION OFF
SONY_COLOR_BIDEO_PRI
NTER_UP-5100_SERIES_
ABCDEFGHIJKLMN
OPQRSTUVWXYZ
0123456789

To move ■ to B

Move the cursor to ←.

Whenever you press the EXEC button, the white cursor shifts by one position.

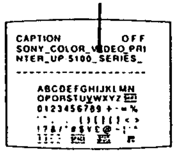



CAPTION OFF
SONY_COLOR_■IDEO_PRI
NTER_UP-5100_SERIES
ABCDEFGHIJKLMN
OPQRSTUVWXYZ
0123456789

3 Enter the correct character over the wrong character.

The previously entered character is replace with the new one.

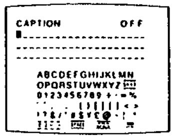
B was replaced with V and ■ moved to the right.


CAPTION OFF
SONY_COLOR_V■DEO_PRI
NTER_UP-5100_SERIES_
ABCDEFGHIJKLMN
OPQRSTUVWXYZ
0123456789

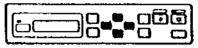
Making printouts with a caption

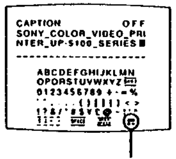
The factory setting for CAPTION is OFF (the printer prints without adding a caption). Set the CAPTION function to ON as follows.

1 Display the CAPTION input screen.


CAPTION OFF
ABCDEFGHIJKLMN
OPQRSTUVWXYZ
0123456789

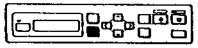
2 Switch ON to green by pressing the [Λ] [V] [<] or [>] buttons.

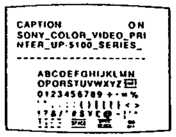



CAPTION OFF
SONY_COLOR_VIDEO_PRI
NTER_UP-5100_SERIES■
ABCDEFGHIJKLMN
OPQRSTUVWXYZ
0123456789

Switched to green.

3 Press the EXEC button.




CAPTION ON
SONY_COLOR_VIDEO_PRI
NTER_UP-5100_SERIES_
ABCDEFGHIJKLMN
OPQRSTUVWXYZ
0123456789

Note
- When you select four- or nine-image printing with white divisions, you can not add a caption.
- When you print in field mode, any caption will not be printed clearly.

1-10. ERROR MESSAGES

When the paper is exhausted, jams or other problems occur, the ALARM lamp lights in orange and an error message stating the problem appears on the video monitor and in the printer window display. Note the message and respond as necessary to rectify the error.

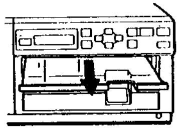
END OF RIBBON

The ink ribbon has been completely used.
Insert a new ribbon.

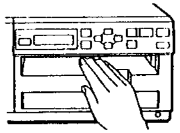
FEED ERROR

A feed error occurs when the paper jams as it is being fed into the ribbon area.

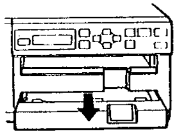
1 **Remove the print tray.**



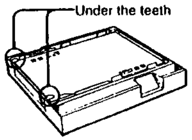
2 **Reach through the opening and slide the paper back in the paper tray.**



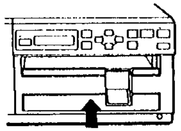
3 **Remove the paper tray.**



4 **Straighten the paper in the tray properly below the teeth.**



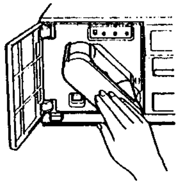
5 **Replace the print tray and paper tray.**



INSERT RIBBON

The ink ribbon cassette is not securely installed.

Insert the ink ribbon cassette firmly.

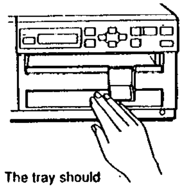


Push the cassette firmly in the center so that it clicks into place.

INSERT TRAY

The paper tray is not properly mounted.

Mount the tray correctly.



The tray should click in place.

NO INPUT

The printer is not receiving an input signal.

Check that:
- The INPUT SELECT setting is correct on MENU 1.
- The video equipment is playing.
- The connections between the video equipment and the printer are secure.

NO PAPER

The paper tray is empty.

Fill the tray with paper or transparencies.

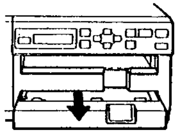
PLEASE WAIT

If you turn the printer off during printing, the printer ejects the unfinished printout. PLEASE WAIT appears on the video monitor when you turn the printer on again. Wait about 20 seconds before operating the printer.

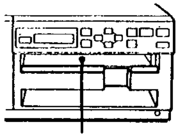
PROCESS ERROR

A process error occurs when the paper jams during the printing process.
When this message appears before the printer starts printing, remove the paper similarly in the same way as when FEED ERROR appears, then reload the paper.
When this message appears during printing, remove the paper and load the paper again.

1 **Remove the paper tray.**
If you can't remove the paper tray, follow the steps given for FEED ERROR.

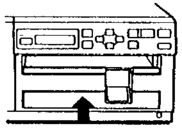


2 **Pull the paper back through the paper tray space and discard the unfinished printout.**



Pull the paper toward you.

3 **Reinsert the paper tray.**



If you turn the printer off and then on again, the paper will be ejected automatically. Any images in memory, however, will be erased.
The paper may be visible above the print tray. In this case, pull the paper out from above the print tray.

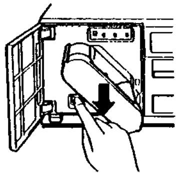
RIBBON ERROR

The ink ribbon is torn or becomes tangled in the printer.

Remove the ink ribbon cassette, take up the slack and reinsert it.

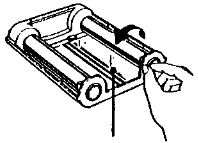
1 **If the paper has become stuck as well, remove it as described under PROCESS ERROR.**

2 **Open the ribbon door. Next, remove the ink ribbon by pressing the EJECT button.**



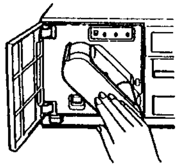
3 **Take up the slack by rolling the ribbon counterclockwise until the black bars are positioned between the rolls.**

If the ink ribbon is torn, repair it with transparent tape. There should be no problem in using the remaining portion of the ribbon.



Position the black bars between the two rolls.

4 **Reinsert the ink ribbon and close the cabinet.**

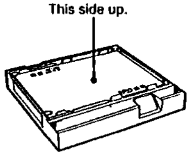


Push the cassette firmly in the center so that it clicks in place.

TURN PAPER OVER

The paper is upside down in the paper tray.

Turn the paper over so that the black mark are facing up.



This side up.

1-11. TROUBLE SHOOTING

Symptom	Causes and remedies
The printer does not print.	• An error message appears on the display. → See "Error Messages" on page 84. • Check that: The power is on. All connections are correct. → See page 18 for an explanation of the connections.
The printout is blurred.	Switch to field mode and print the image. (See page 62.)
A black line appears on the printout.	See "If a Black Line Appears on Printouts" on page 75 and adjust the image. Store a new image and print it. If a black line still appears on the printout. See "Changing the screen size" and change the screen size. Store a new image and print it.
The printer makes a printout with black divisions.	See "Changing the screen size" and change the screen size. Store a new image and print it.
The printed image or caption is partially cut out.	
Nothing appears on the video monitor.	If an incorrect sync signal is input, nothing may appear on the monitor. In this case, check the video monitor first by pressing the SOURCE/MEMORY button to display the image stored in memory. If an image appears, the video monitor is working correctly. → Change the INPUT SELECT settings on the menu screen. Or, set the connected video equipment to playback mode, if it is in another mode such as stop mode.

1-12. SERVICE MODE

1-12-1. Operation :

The unit can be entered in service mode by simultaneously holding down the MEMORY-IN and STOP keys.

Check :
Once service mode is entered, one of the ≪TEST MODE SERVICE≫ screens shown in Fig1-① will appear on the screen. If you do not have a monitor, an LCD will do. The default screen after startup is ≪STAIR STEP (H)≫.

Note: Once you execute a signal in service mode, the screen selected will be stored in memory such that display will appear the next time service mode is entered. The screen ≪STAIR STEP (H)≫ appears whenever power is turned off then on again because memory is reset.

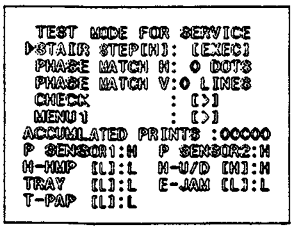
1-12-2. Generating Special Signals

In sevice mode, a display shows the types of special signals that can be generated appears on the first line. There are eight types. Screens shown below can be written into memory, and output made to the monitor or printer. These signals are extremely useful in checking print functions and signal flow after leaving memory circuits.

First, press the SOURCE/MEMORY Key to bring up the memory screen. Next, move the cursor using the ∧ and ∨ keys to select the signal line. Move the cursor using the < and > keys to select the desired signal. Eight types of signals, described below, are available. After selecting a signal, press the EXEC key. Although execution time depends on the signal selected, the selected signal will be output on the monitor (monitor black while waiting) within several seconds to several tens of seconds.

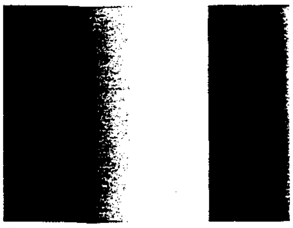
Note: Be sure that the COLOR adjustment is aligned with center in normal service mode test signals can be used most effectively. There are many advantages to having COLOR set to center.

[STAIR STEP (H)]
A stair step signal such as that shown in Fig.1-② is written into memory. This signal can be used to check darkness when replacing the thermal head.



```
  TEST MODE FOR SERVICE
▶STAIR STEP[H]:  [EXEC]
  PHASE MATCH H:  0 DOTS
  PHASE MATCH V:0 LINES
  CHECK          :  [>]
  MENU1          :  [>]
ACCUMLATED PRINTS :00000
P SENSOR1:H  P SENSOR2:H
H-HMP  [L]:L  H-U/D [H]:H
TRAY   [L]:L  E-JAM [L]:L
T-PAP  [L]:L
```

① SERVICE MODE MENU

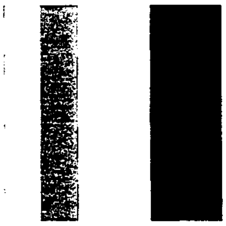


② 16 Stair step (H)

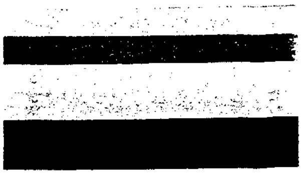
③ 16 Stair step(H)

④ RAMP(H)

⑤ RAMP(V)

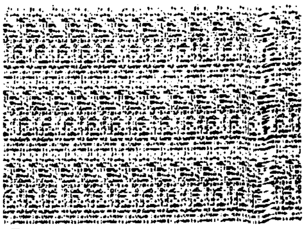


⑥ COLOR BAR(H)



⑦ COLOR VAR(V)

⑧ COLOR PATTERN



⑨ CAPTION

Fig.1 SERVICE MODE PATTERN

[STAIR STEP(V)]
A stair signal such as that shown in Fig.1 – ③ is written into memory. Print signals to the printer are sent in the vertical direction in relation to the thermal head. This signal can be used to check for any errors in sending such signals, because any shift in the vertical direction when printing this stair step pattern will indicate an error.

[RAMP (H)]
A ramp signal such as that shown in Fig.1 – ④ is written into memory. This signal can be used to check for missing bits in digital signals, or to visually identify improper resistance of the thermal head.

[RAMP(V)]
A ramp signal such as that shown in Fig.1 – ⑤ is written into memory. This signal can also be used to check for missing bits in digital signals. It is also perfect for checking if print signals are being sent normally. This is because this signal offers a constant slope in the vertical direction. A description on how to use this signal in checking memory boards is given later.

[COLOR BAR(H)]
A color-bar signal such as that shown in Fig.1 – ⑥ is written into memory. This signal can also be used in the same way as[COLOR BAR(V)].

[COLOR BAR(V)]
A color-bar signal such as that shown in Fig.1 – ⑦ is written into memory. This signal can be used when adjusting R, G, or B of the encoder.

[COLOR PATTERN]
A color-pattern signal such as that shown in Fig.1 – ⑧ is written into memory. This signal can be used in checking the masking circuit. When this signal is greatly different from the monitor, the circuit is probably bad.

[CAPTION]
A caption signal such as that shown in Fig.1 – ⑨ is written into memory. This signal can be used to check if colors are correct.

[OPTION1~]
This is provided only for design purposes and produces no pattern.

These that signals are written into the DRAM of FMY-8. The test signals are generated by the CPU on the same board before being written to DRAM. Accordingly, all signals written are accurate and have 8-bit quantized precision. Although signal flow for the UP-5100/5200 Series is a three signal flow as given by(1),(2) and (3)in Fig. 2, for this set, signal flow(2) output to monitor TV and signal flow (3) output to the printer. Simple uses for these signals during service are described below.

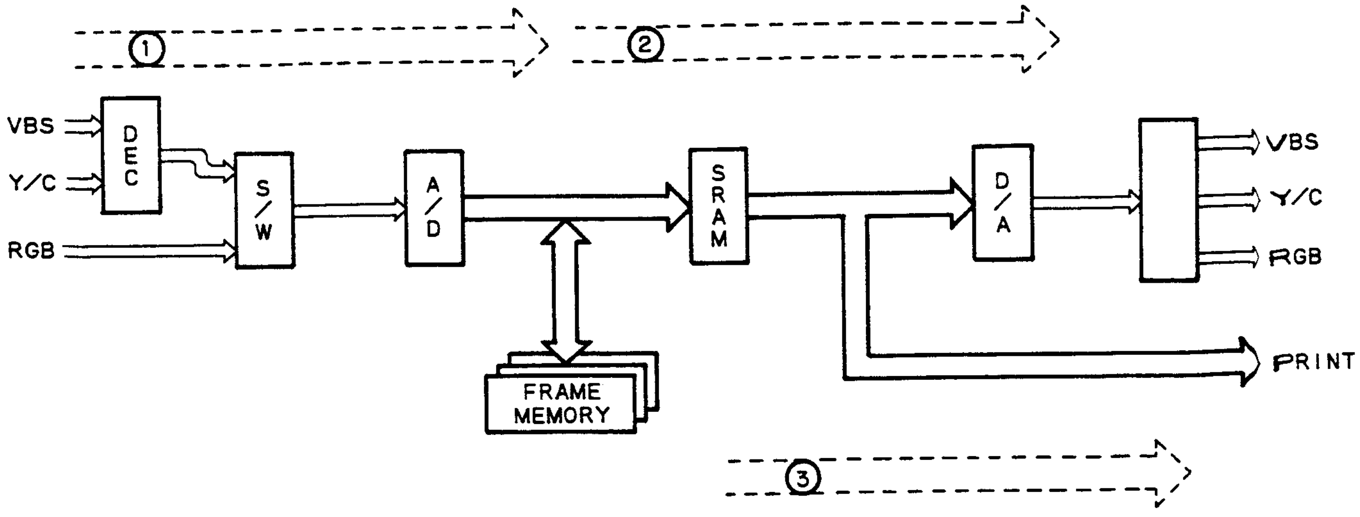


Fig.2 UP-5100/5150 Series signal flow

[Analog Circuit Check]
There are analog circuits on both sides of the digital circuit. Since this digital circuit can generate test signals, it is possible to check if there are problems in either analog circuit. If a test signal shows the circuits to be normal even though user-input signals result in errors, there is a strong possibility that there is a problem before the digital circuit in either the IF-19 board (input circuit) or VA-26 board (decoder circuit), or if a test signal does not show, there is a strong possibility that there is a problem after the digital circuit in either VA-26 board (encoder) or IF-19 board (output circuit), or in the digital board (FMY-8 board)itself. Make a PRINT to determine in this case whether the digital or an analog circuit is the problem. If there is no problem in printing, an analog circuit is probably at fault. A further check of the FMY-8 board can be made by using the RAMP (H) test signal.

Test signals can also be used during adjustment to check voltage levels in the analog circuit after the digital circuit. Since maximum white levels and complete black levels are used in black-and white displays, test signals may even be used as reference signals. The color-bar signals may also be used during adjustment since they are output at 100% of reference level. Colors are in the order of yellow, cyan, green, magenta, red, blue and black.

[PRINT Check]
Any test signal that varies in the vertical direction is very useful whenever there are problems when printing but no problem with monitor output. The easiest of these to use is the RAMP(V) signal. Observe CN3 of the FMY-8 board while printing. If you observe a waveform such as that shown in Fig. 3, there is no problem with the FMY-8 board. The problem in this case is with the SY-9 board which controls the PRINT engine. Note that no meaningful data is transmitted during the occurrence of a vertical blanking while the [DATA ENABLE] signal is active.

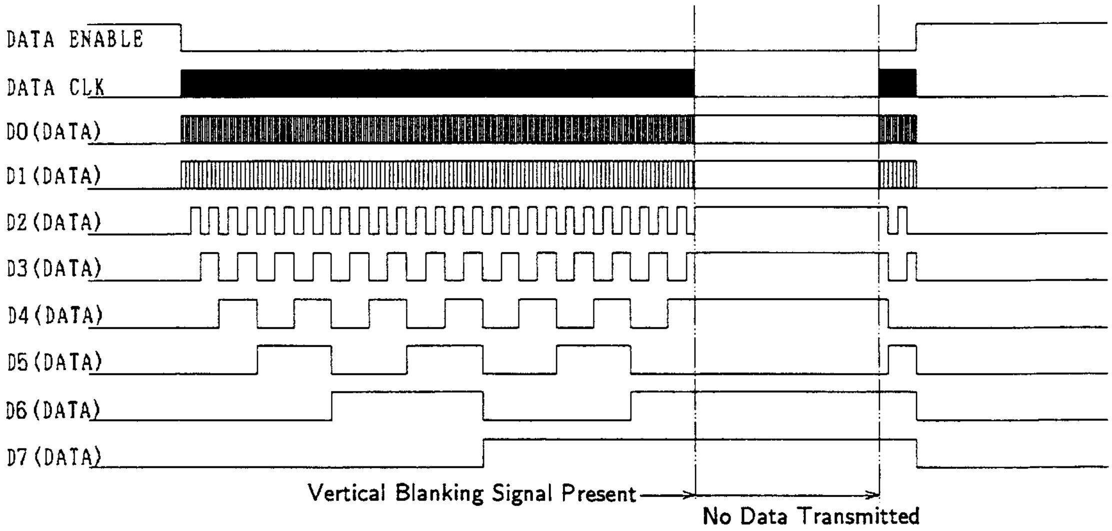


Fig.3 Example of FMY-8 board and SY-9 board PRINT Data Transmissions

1-12-3. Phase Match

This feature is provided so that the phase of the input signal and the MEMORY OUT signal may be aligned on the monitor. A phase difference between the SYNC and VIDEO signals occurs due to the fact that the pass through which the input signals pass depends on that input signal's type. Accordingly, since the MEMORY OUT signal does not pass through any pass at all no such phase difference occurs. Accordingly, the phase of the SYNC and VIDEO signals of the input signal and MEMORY OUT signal (output after first strong that same input signal in memory) will not match due to this deviation. Since the input phase is fixed as long as the user's signal source is fixed, this Phase Match function is provided to exactly match the MEMORY OUT signal output with the phase of the input signal. The MEMORY OUT signal can be shifted right in steps of 22 sampling clocks, or left in steps of 36 sampling clocks.

1-12-4. CHECK

The picture tube display can be made to disappear by continuously holding down the $\boxed{>}$ key.

1-12-5. MENU 1

[MENU 1] can be entered without leaving service mode by pressing the $\boxed{>}$ key.

1-12-6. Total number of Printed Sheets Check

This check gives the total number of sheets that this printer has printed up to now. This can be used to predict the remaining life of the thermal head.

1-12-7. Sensor Level

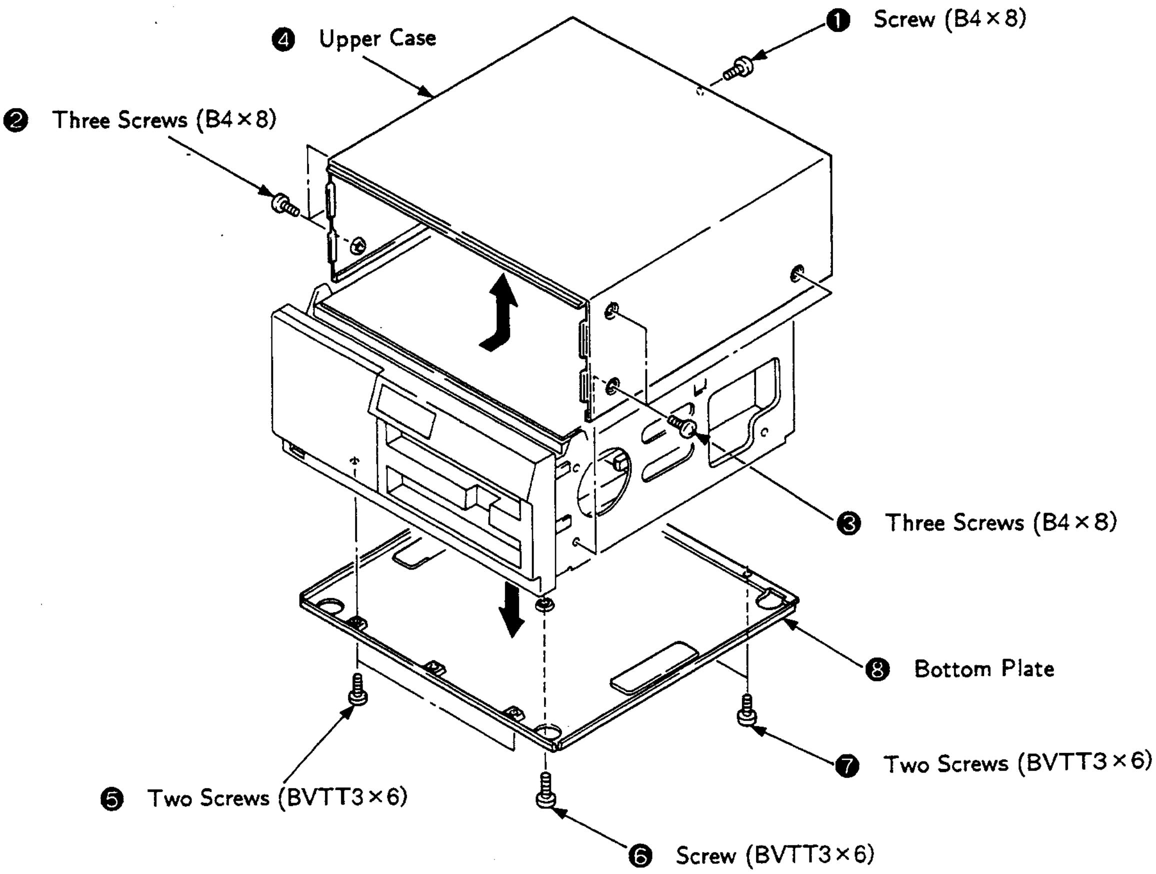
This feature displays the sensor level. Note that this is not a realtime display. The value displayed is that stored in memory from the last time service mode was entered. If you wish to see as recent a value as possible, simultaneously press the $\boxed{\text{MEMORY-IN}}$ and $\boxed{\text{STOP}}$ keys.

1-12-8. Thermal Head Temperature

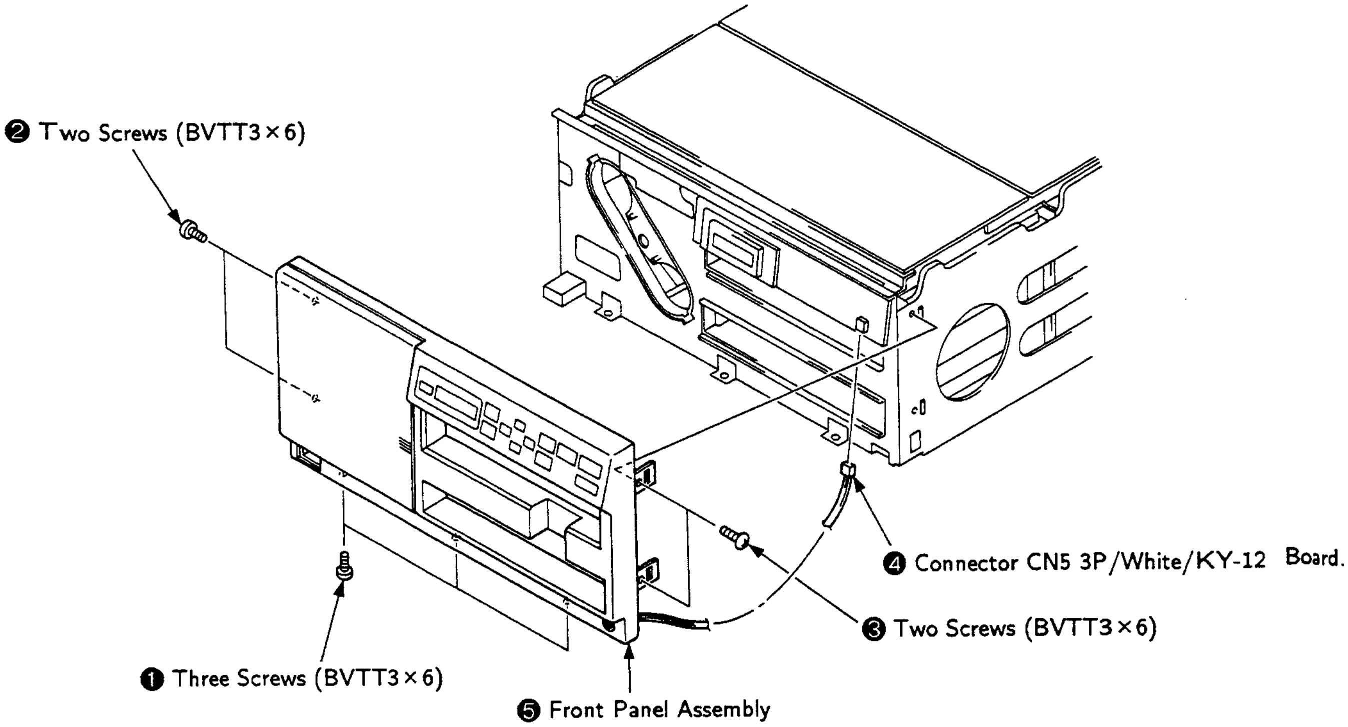
This fearure converts the voltage used by the thermistor built into the thermal head and displays it as a digital temperature value. Although the value represents temperature, the reading is not in any standard units of temperature. The value decreases as voltage is applied to the head and its temperature rises. The display is in realtime if nothing is currently being printed. During printing the value stored in memory immediately prior to printing is displayed.

SECTION 2
DISASSEMBLY

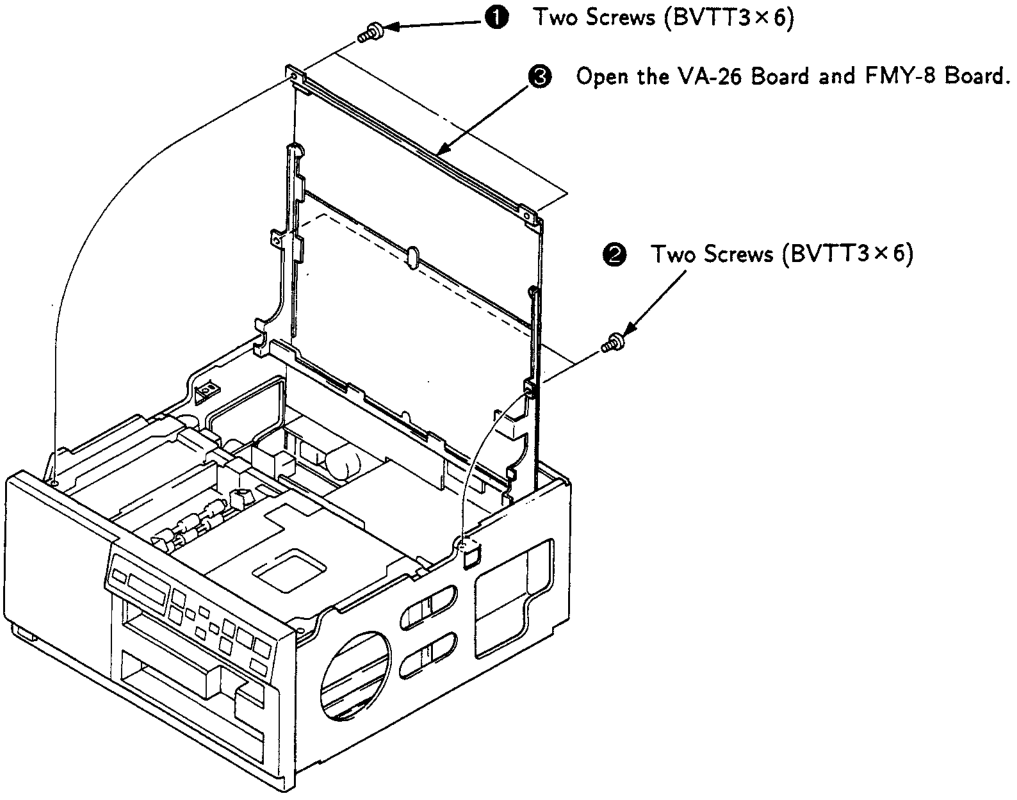
2-1. CABINET REMOVAL


❶ Screw (B4×8)
❷ Three Screws (B4×8)
❸ Three Screws (B4×8)
❹ Upper Case
❺ Two Screws (BVTT3×6)
❻ Screw (BVTT3×6)
❼ Two Screws (BVTT3×6)
❽ Bottom Plate

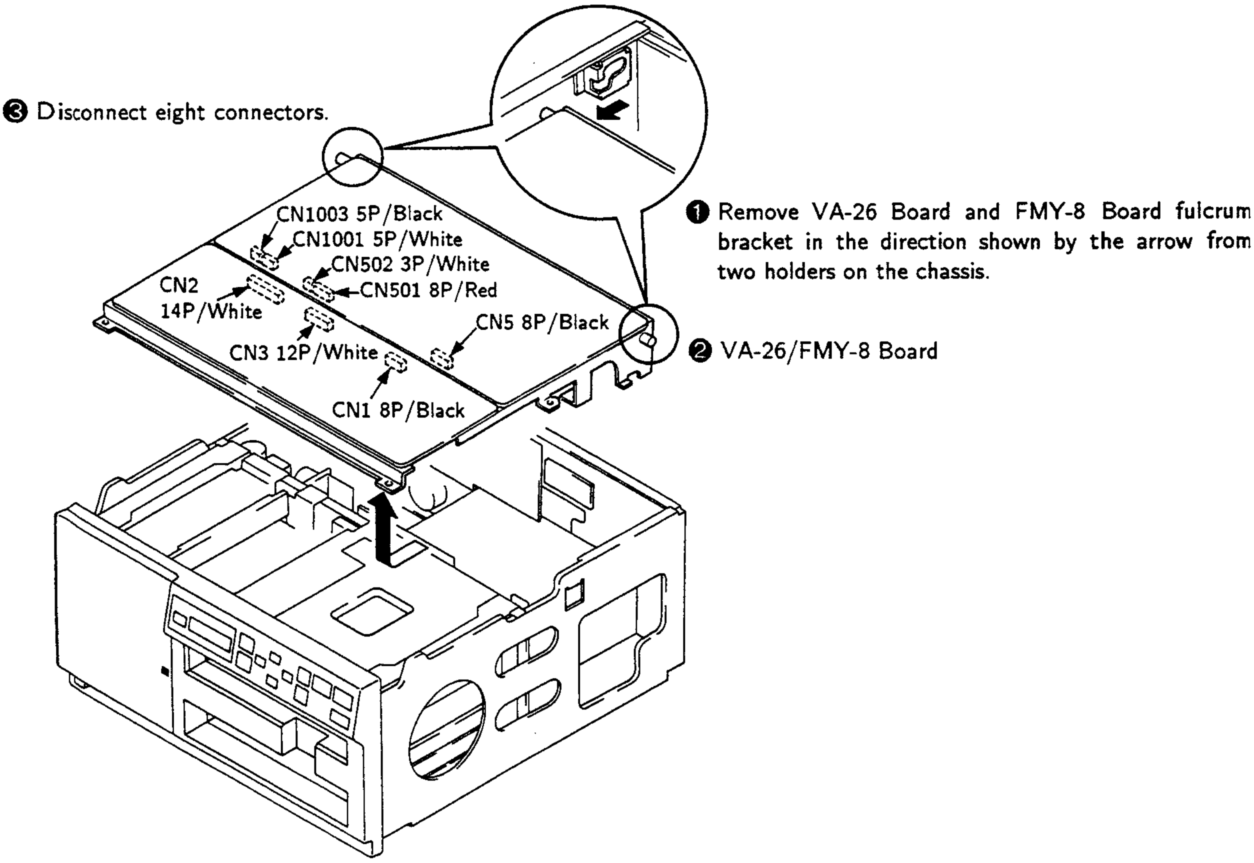
2-2. FRONT PANEL ASSEMBLY REMOVAL


❶ Three Screws (BVTT3×6)
❷ Two Screws (BVTT3×6)
❸ Two Screws (BVTT3×6)
❹ Connector CN5 3P/White/KY-12 Board.
❺ Front Panel Assembly

2-3. HOW TO OPEN VA-26 BOARD AND FMY-8 BOARD

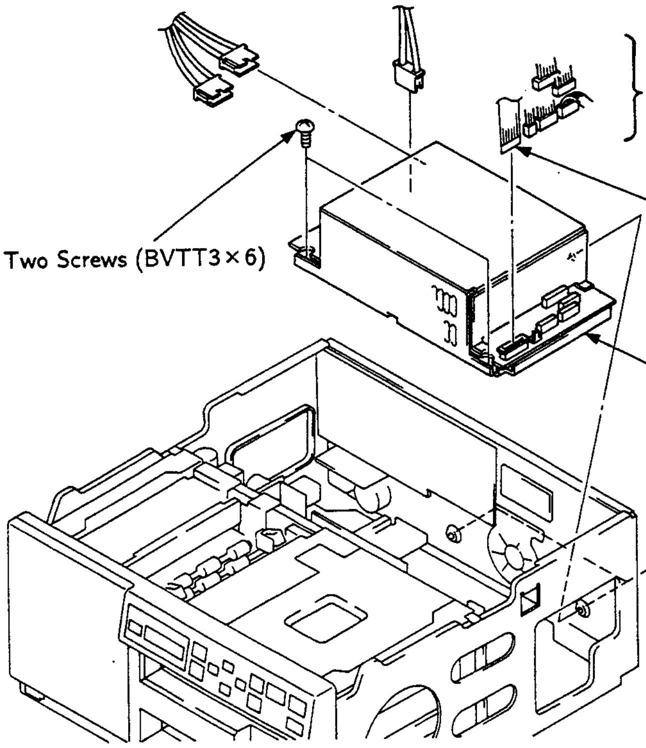

❶ Two Screws (BVTT3×6)
❸ Open the VA-26 Board and FMY-8 Board.
❷ Two Screws (BVTT3×6)

2-4. VA-26 AND FMY-8 BOARD REMOVAL


❸ Disconnect eight connectors.
CN1003 5P/Black
CN1001 5P/White
CN502 3P/White
CN501 8P/Red
CN2 14P/White
CN3 12P/White
CN5 8P/Black
CN1 8P/Black
❶ Remove VA-26 Board and FMY-8 Board fulcrum bracket in the direction shown by the arrow from two holders on the chassis.
❷ VA-26/FMY-8 Board

2-5. SWITCHING REGULATOR REMOVAL

Note: Remove switching regulator after VA-26 board and FMY-8 board removal. (See Item 2-4.)



❶ Disconnect three 2pin connectors CN7, CN9 and CN10.
(Note: Disconnect connectors without pulling wires.)

❷ Disconnect five connectors CN1 8P/white, CN2 14P/white, CN4 9P/white, CN6 3P/Red, and CN12 10P/white.

❸ Flat cable : CN5 16P/white
(Note : Pull out the flat cable after pulling up the upper side of connector.)

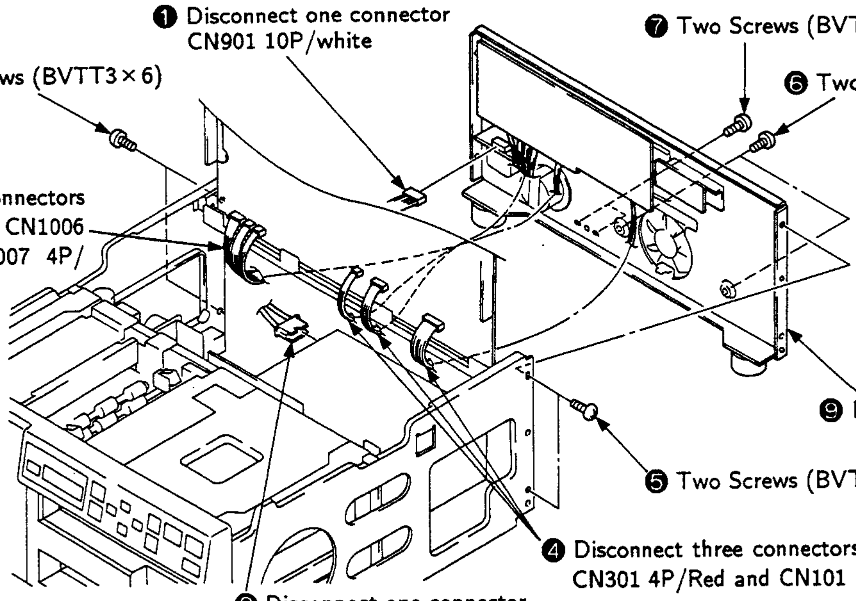
❹ Two Screws (BVTT3 × 6)

❺ Two Screws (BVTT3 × 8)

❻ Switching Regulator

2-6. REAR PANEL ASSEMBLY REMOVAL

Note: Remove rear panel assembly after opening VA-26/FMY-8 board. (See Item 2-3.)



❶ Disconnect one connector CN901 10P/white

❷ Disconnect three connectors CN1005 8P/white, CN1006 2P/white and CN1007 4P/white.

❸ Disconnect one connector CN7 2P (Switching Regulator)

❹ Disconnect three connectors CN302 2P/Red, CN301 4P/Red and CN101 8P/Red.

❺ Two Screws (BVTT3 × 6)

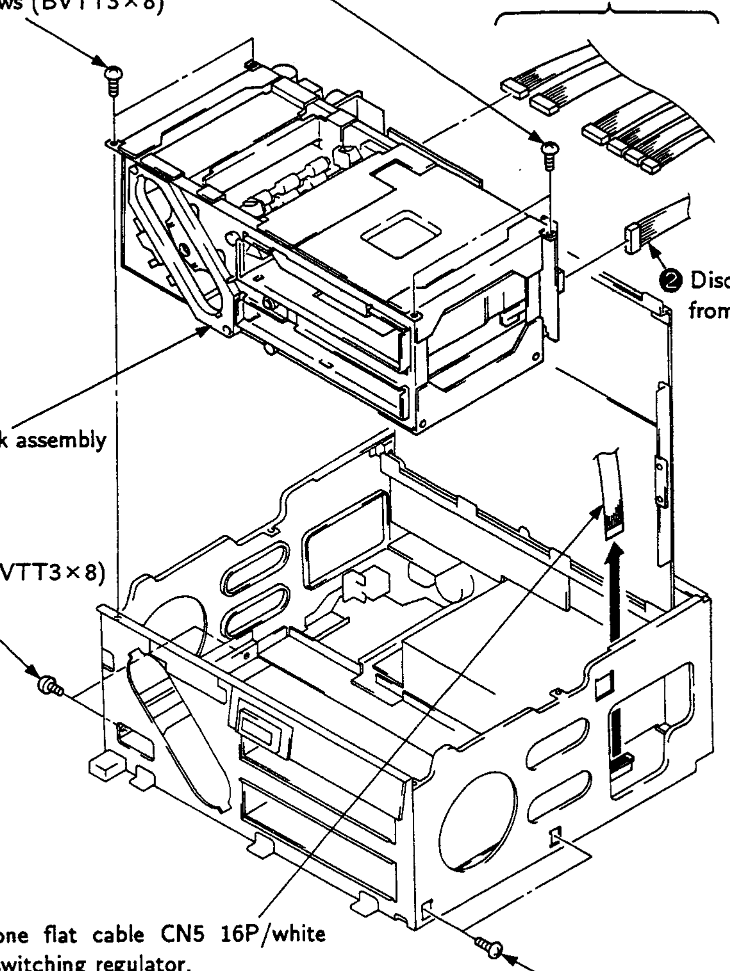
❻ Two Screws (BVTT3 × 8)

❼ Two Screws (BVTT3 × 6)

❽ Two Screws (BVTT3 × 6)

❾ Rear Panel Assembly

2-7. MECHANISM BLOCK ASSEMBLY REMOVAL



❶ Disconnect six connectors CN1 8P/white, CN3 8P/Red, CN4 8P/Black, CN5 12P/white, CN6 6P/Red and CN12 10P/white from the SY-9 board.

❷ Disconnect one connector CN8 10P/Red from the SY-9 board.

❸ Remove one flat cable CN5 16P/white from the switching regulator.
(Note : Pull out the flat cable after pulling up the upper side of connector.)

❹ Two Screws (BVTT3 × 8)

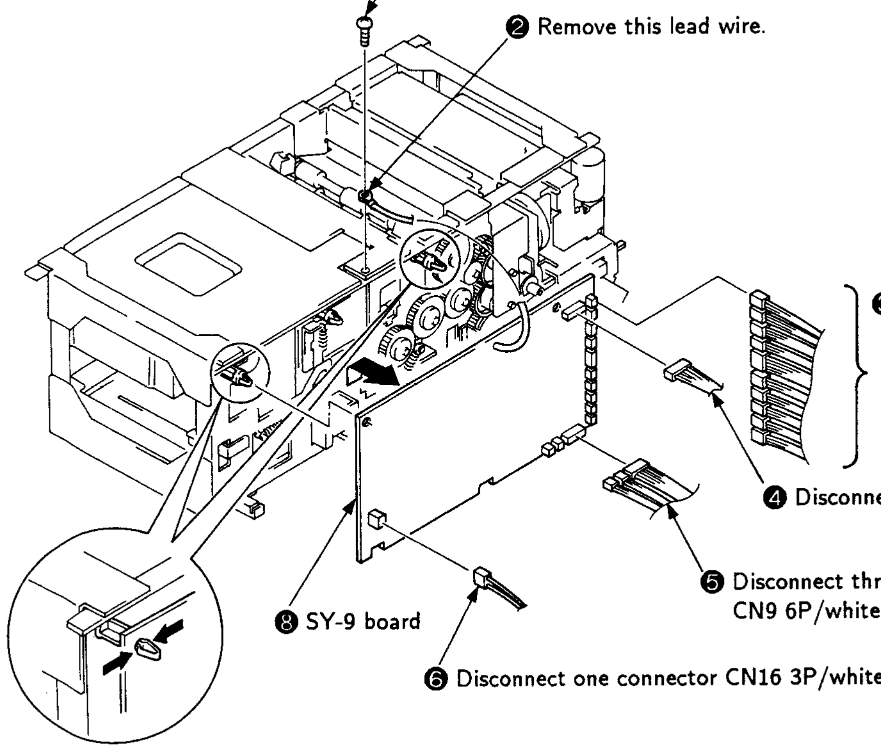
❺ Two Screws (BVTT3 × 8)

❻ Two Screws (BVTT3 × 8)

❼ Two Screws (BVTT3 × 8)

❽ Mechanism block assembly

2-8. SY-9 BOARD REMOVAL



❶ Screw (BVTT3 × 6)

❷ Remove this lead wire.

❸ Disconnect ten connectors.
CN7 5P/ Black, CN11 3P/ Black,
CN13 3P/ Black, CN14 4P/ White,
CN17 3P/ White, CN18 3P/ White,
CN19 3P/ Yellow, CN20 3P/ White,
CN21 3P/ Red and CN22 3P/ Yellow.

❹ Disconnect one connector CN15 6P/white.

❺ Disconnect three connectors.
CN9 6P/white, CN10 3P /white and CN12 3P/Red.

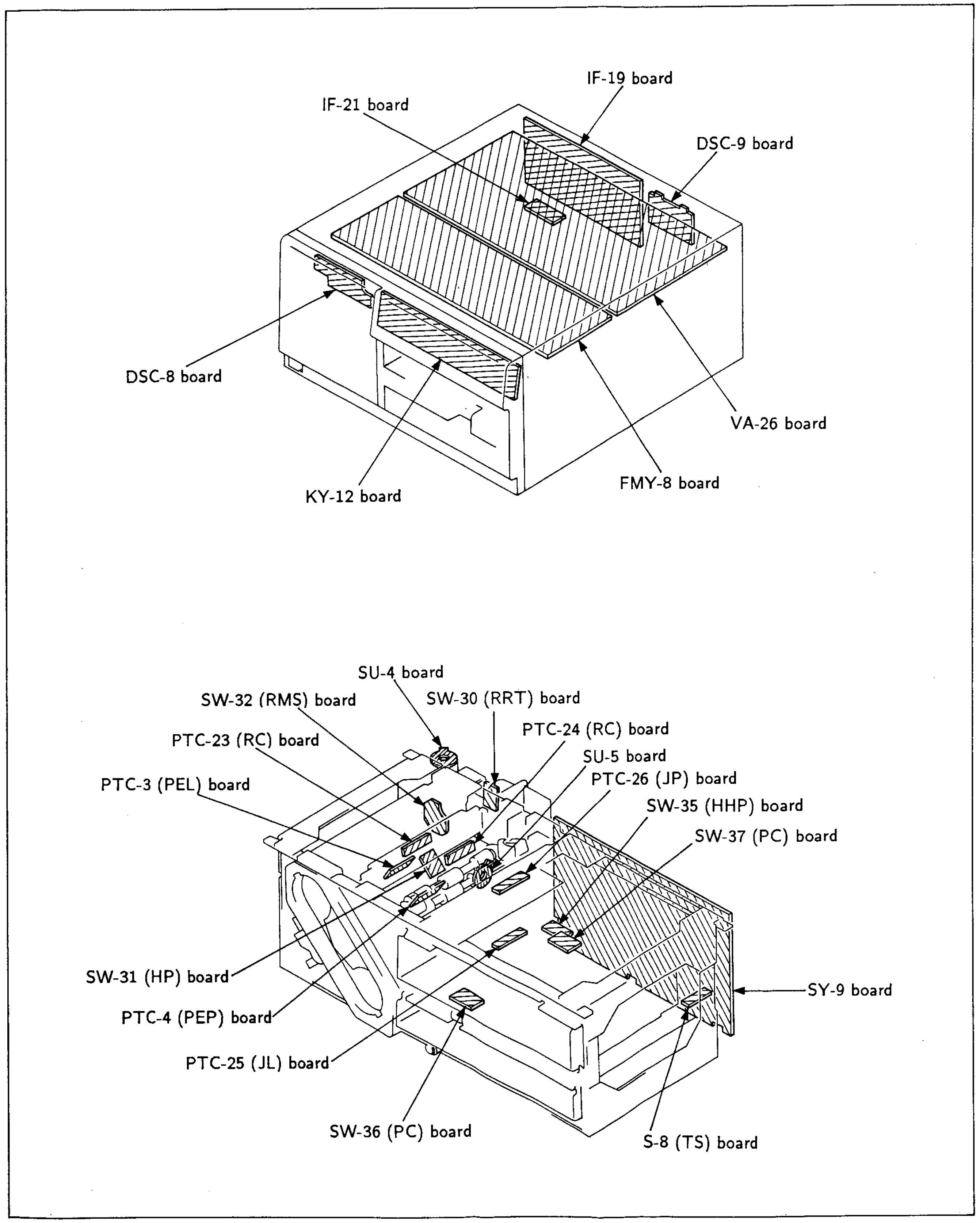
❻ Disconnect one connector CN16 3P/white.

❼ Push two claws and remove the SY-9 board.

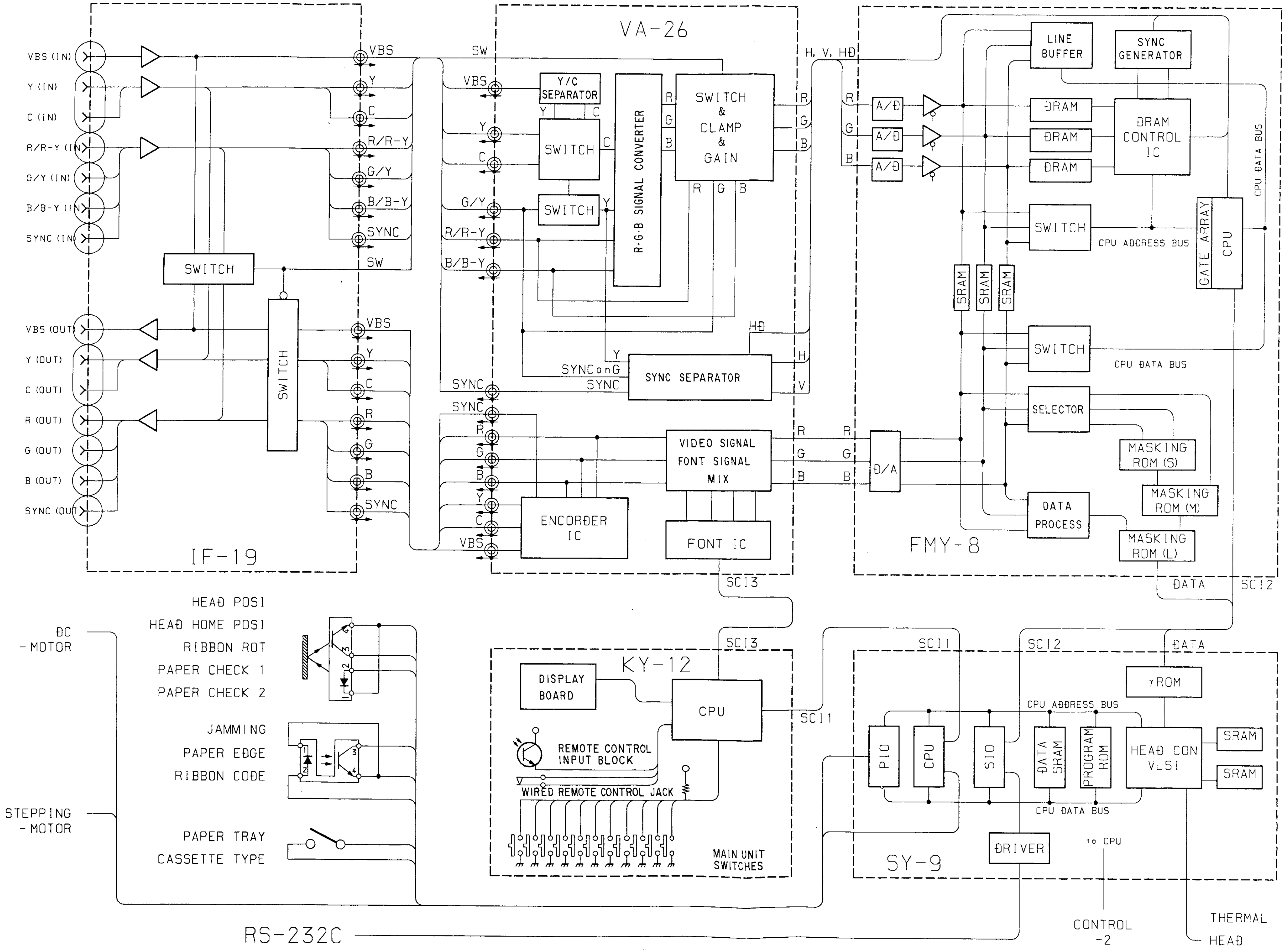
❽ SY-9 board

SECTION 3
DIAGRAMS

3-1. CIRCUIT BOARDS LOCATION


IF-19 board
IF-21 board
DSC-9 board
DSC-8 board
VA-26 board
FMY-8 board
KY-12 board
SU-4 board
SW-32 (RMS) board
SW-30 (RRT) board
PTC-24 (RC) board
PTC-23 (RC) board
SU-5 board
PTC-26 (JP) board
PTC-3 (PEL) board
SW-35 (HHP) board
SW-37 (PC) board
SW-31 (HP) board
SY-9 board
PTC-4 (PEP) board
PTC-25 (JL) board
SW-36 (PC) board
S-8 (TS) board

3-2. BLOCK DIAGRAM


VBS (IN)
Y (IN)
C (IN)
R/R-Y (IN)
G/Y (IN)
B/B-Y (IN)
SYNC (IN)
VBS (OUT)
Y (OUT)
C (OUT)
R (OUT)
G (OUT)
B (OUT)
SYNC (OUT)
SWITCH
SWITCH
IF-19
VBS
Y
C
R/R-Y
G/Y
B/B-Y
SYNC
SW
R
G
B
VA-26
Y/C SEPARATOR
SWITCH
SWITCH
R·G·B SIGNAL CONVERTER
SWITCH & CLAMP & GAIN
SYNC SEPARATOR
SYNConG
HD
H
V
H, V, HD
VIDEO SIGNAL FONT SIGNAL MIX
ENCORDER IC
FONT IC
SCI3
FMY-8
LINE BUFFER
SYNC GENERATOR
A/D
DRAM
DRAM CONTROL IC
SWITCH
CPU ADDRESS BUS
GATE ARRAY
CPU
CPU DATA BUS
SRAM
SELECTOR
MASKING ROM (S)
MASKING ROM (M)
MASKING ROM (L)
D/A
DATA PROCESS
DATA
SCI2
DC -MOTOR
STEPPING -MOTOR
HEAD POSI
HEAD HOME POSI
RIBBON ROT
PAPER CHECK 1
PAPER CHECK 2
JAMMING
PAPER EDGE
RIBBON CODE
PAPER TRAY
CASSETTE TYPE
KY-12
DISPLAY BOARD
CPU
REMOTE CONTROL INPUT BLOCK
WIRED REMOTE CONTROL JACK
MAIN UNIT SWITCHES
SCI1
SY-9
γROM
PIO
SIO
DATA SRAM
PROGRAM ROM
HEAD CON VLSI
SRAM
DRIVER
to CPU
CONTROL -2
THERMAL HEAD
RS-232C

SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

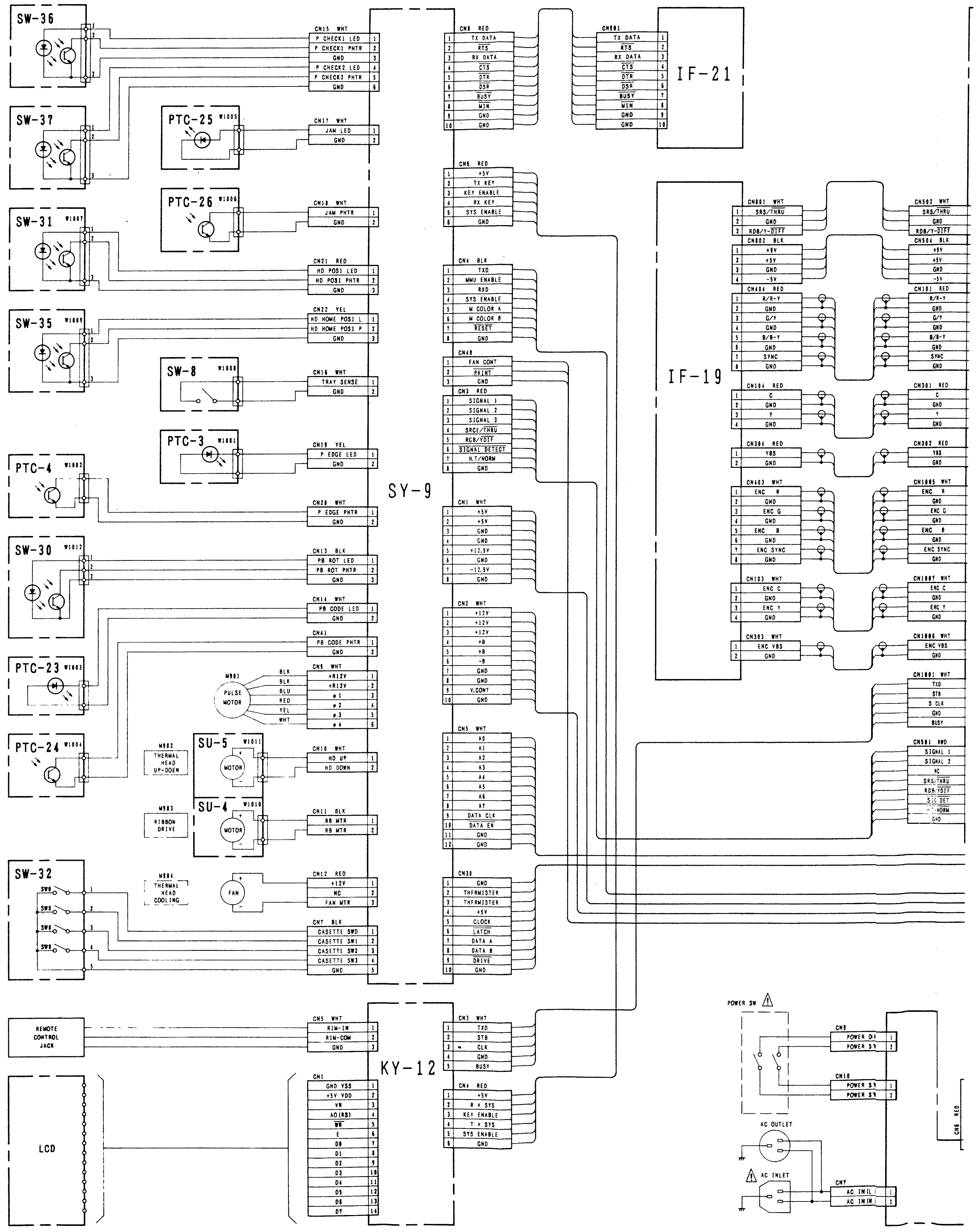
4-1. FRAME SCHEMATIC DIAGRAM

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

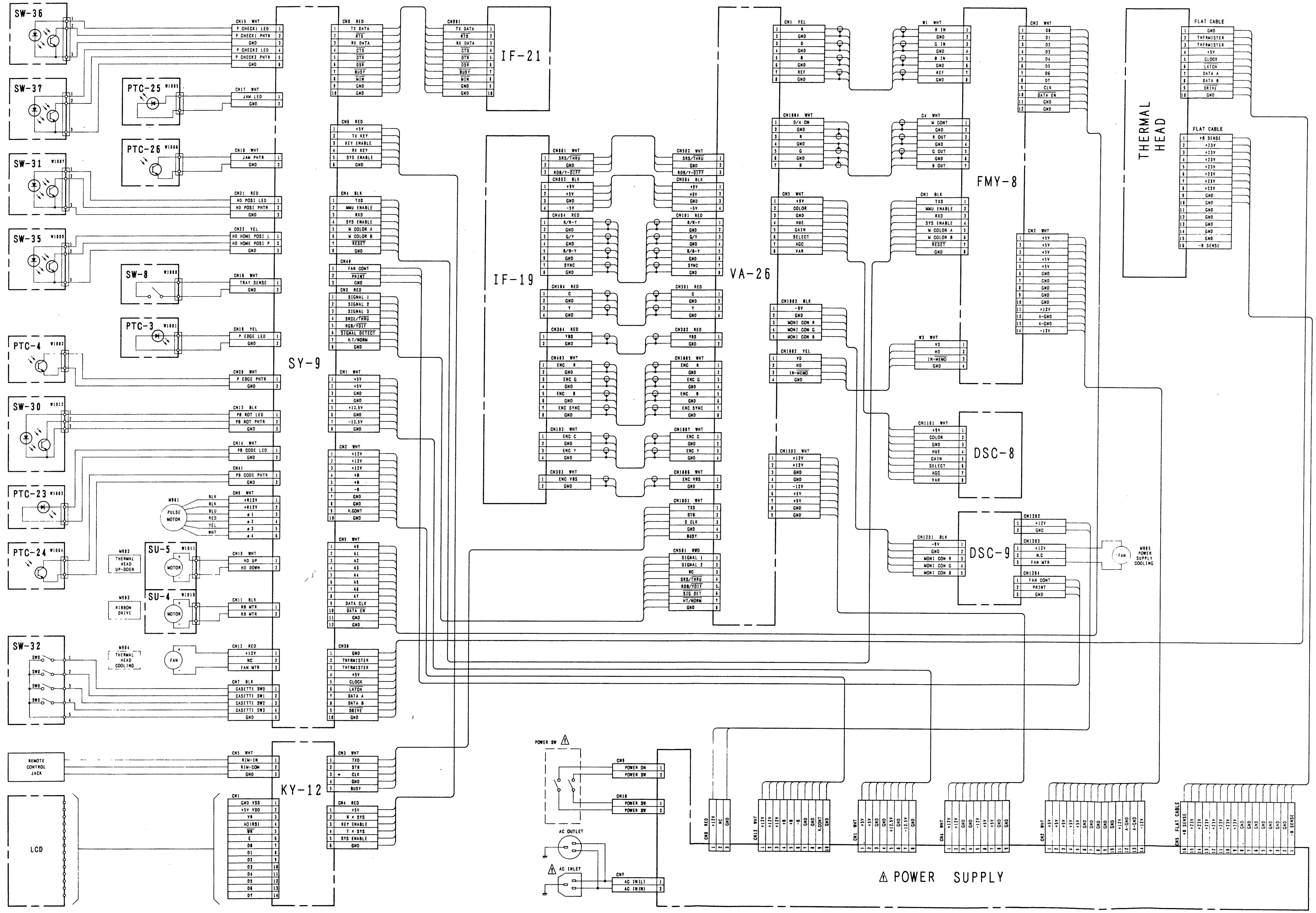
- **For schematic diagrams.**
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minuts side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/10W unless otherwise noted.
  kΩ : 1000Ω , MΩ : 1000kΩ .
- All capacitors are in μF unless otherwise noted. pF: μμF.
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⊡ : nonflammable resistor.
- ⊡ : fusible resistor.
- ☐ : panel designation.
- ☐ : adjustment for repeair.
- —— : B+ Line.
- ---- : B- Line.
- Voltages are dc between ground and measurement points.
- Readings are taken with a color-bar signal playback.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une piece portant le numéro spécifié.



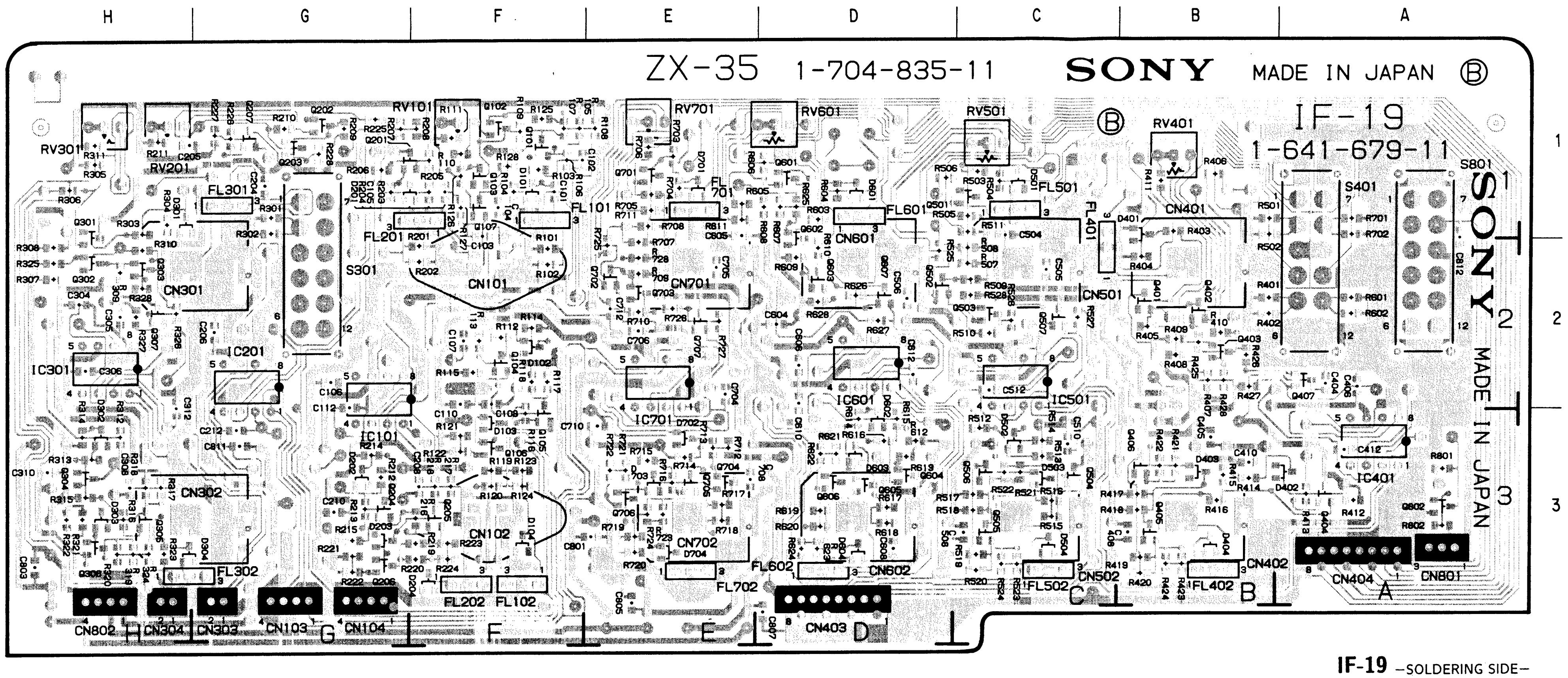
SW-36
SW-37
PTC-25
PTC-26
SW-31
SW-35
SW-8
PTC-3
PTC-4
SW-30
PTC-23
PTC-24
SU-5
SU-4
SW-32
REMOTE CONTROL JACK
LCD
SY-9
KY-12
IF-21
IF-19
PULSE MOTOR
THERMAL HEAD UP-DOWN
RIBBON DRIVE
THERMAL HEAD COOLING
MOTOR
FAN
POWER SW ⚠
AC OUTLET
⚠ AC INLET


SW-36
SW-37
SW-31 W1007
SW-35 W1009
PTC-25 W1005
PTC-26 W1006
SW-8 W1008
PTC-3 W1001
PTC-4 W1002
SW-30 W1012
PTC-23 W1003
PTC-24 W1004
SW-32
SW0
SU-5 W1011
SU-4 W1010
MOTOR
M901 PULSE MOTOR
BLK BLK BLU RED YEL WHT
M902 THERMAL HEAD UP-DOEN
M903 RIBBON DRIVE
M904 THERMAL HEAD COOLING
FAN
REMOTE CONTROL JACK
LCD
SY-9
CN15 WHT: P CHECK1 LED, P CHECK1 PHTR, GND, P CHECK2 LED, P CHECK2 PHTR, GND
CN17 WHT: JAM LED, GND
CN18 WHT: JAM PHTR, GND
CN21 RED: HD POSI LED, HD POSI PHTR, GND
CN22 YEL: HD HOME POSI L, HD HOME POSI P, GND
CN16 WHT: TRAY SENSE, GND
CN19 YEL: P EDGE LED, GND
CN20 WHT: P EDGE PHTR, GND
CN13 BLK: PB ROT LED, PB ROT PHTR, GND
CN14 WHT: PB CODE LED, GND
CN41: PB CODE PHTR, GND
CN9 WHT: +R12V, +R12V, φ1, φ2, φ3, φ4
CN10 WHT: HD UP, HD DOWN
CN11 BLK: RB MTR, RB MTR
CN12 RED: +12V, NC, FAN MTR
CN7 BLK: CASETTE SWD, CASETTE SW1, CASETTE SW2, CASETTE SW3, GND
CN8 RED: TX DATA, RTS, RX DATA, CTS, DTR, DSR, BUSY, MIN, GND, GND
CN6 RED: +5V, TX KEY, KEY ENABLE, RX KEY, SYS ENABLE, GND
CN4 BLK: TXD, MMU ENABLE, RXD, SYS ENABLE, M COLOR A, M COLOR B, RESET, GND
CN40: FAN CONT, PRINT, GND
CN3 RED: SIGNAL 1, SIGNAL 2, SIGNAL 3, SRCE/THRU, RGB/YDIF, SIGNAL DETECT, H.T/NORM, GND
CN1 WHT: +5V, +5V, GND, GND, +12.5V, GND, -12.5V, GND
CN2 WHT: +12V, +12V, +12V, +B, +B, -B, GND, GND, V.CONT, GND
CN5 WHT: A0, A1, A2, A3, A4, A5, A6, A7, DATA CLK, DATA EN, GND, GND
CN30: GND, THFRMISTER, THFRMISTER, +5V, CLOCK, LATCH, DATA A, DATA B, DRIVE, GND
KY-12
CN5 WHT: RIM-IN, RIM-COM, GND
CN1: GND VSS, +5V VDD, VR, AO(RS), WR, E, D0, D1, D2, D3, D4, D5, D6, D7
CN3 WHT: TXD, STB, CLK, GND, BUSY
CN4 RED: +5V, R × SYS, KEY ENABLE, T × SYS, SYS ENABLE, GND
IF-21
CN901: TX DATA, RTS, RX DATA, CTS, DTR, DSR, BUSY, MIN, GND, GND
IF-19
CN801 WHT: SRS/THRU, GND, RDB/Y-DIFF
CN802 BLK: +9V, +5V, GND, -5V
CN404 RED: R/R-Y, GND, G/Y, GND, B/B-Y, GND, SYNC, GND
CN104 RED: C, GND, Y, GND
CN304 RED: YBS, GND
CN403 WHT: ENC R, GND, ENC G, GND, ENC B, GND, ENC SYNC, GND
CN103 WHT: ENC C, GND, ENC Y, GND
CN303 WHT: ENC VBS, GND
VA-26
CN502 WHT: SRS/THRU, GND, RDB/Y-DIFF
CN504 BLK: +9V, +5V, GND, -5V
CN101 RED: R/R-Y, GND, G/Y, GND, B/B-Y, GND, SYNC, GND
CN301 RED: C, GND, Y, GND
CN302 RED: YBS, GND
CN1005 WHT: ENC R, GND, ENC G, GND, ENC B, GND, ENC SYNC, GND
CN1007 WHT: ENC C, GND, ENC Y, GND
CN1006 WHT: ENC VBS, GND
CN1001 WHT: TXD, STB, S CLK, GND, BUSY
CN501 RWD: SIGNAL 1, SIGNAL 2, NC, SRS/THRU, RDB/YDIF, SIG DET, HT/NORM, GND
CN1 YEL: R, GND, D, GND, B, GND, REF, GND
CN1004 WHT: D/A ON, GND, R, GND, G, GND, B
CN5 WHT: +9V, COLOR, GND, HUE, GAIN, SELECT, AGC, VAR
CN1003 BLK: -9V, GND, MONI CON R, MONI CON G, MONI CON B
CN1002 YEL: VD, HD, IN-MEMO, GND
CN1503 WHT: +12V, +12V, GND, GND, -12V, +5V, +5V, GND, GND
FMY-8
W1 WHT: R IN, GND, G IN, GND, B IN, GND, REF, GND
C4 WHT: M CONT, GND, R OUT, GND, G OUT, GND, B OUT
CN1 BLK: TXD, MMU ENABLE, RXD, SYS ENABLE, M COLOR A, M COLOR B, RESET, GND
W3 WHT: VD, HD, IN-MEMO, GND
CN3 WHT: D0, D1, D2, D3, D4, D5, D6, D7, CLK, DATA EN, GND, GND
CN2 WHT: +5V, +5V, +5V, +5V, +5V, GND, GND, GND, GND, GND, +12V, A-GND, A-GND, -12V
DSC-8
CN1101 WHT: +9V, COLOR, GND, HUE, GAIN, SELECT, AGC, VAR
DSC-9
CN1201 BLK: -9V, GND, MONI CON R, MONI CON G, MONI CON B
CN1202: +12V, GND
CN1203: +12V, N.C, FAN MTR
CN1204: FAN CONT, PRINT, GND
FAN
M905 POWER SUPPLY COOLING
THERMAL HEAD
FLAT CABLE: GND, THFRMISTER, THFRMISTER, +5V, CLOCK, LATCH, DATA A, DATA B, DRIVE, GND
FLAT CABLE: +B SENSE, +23V, +23V, +23V, +23V, +23V, +23V, +23V, GND, GND, GND, GND, GND, GND, GND, -B SENSE
POWER SW ⚠
AC OUTLET
⚠ AC INLET
CN9: POWER ON, POWER SW
CN10: POWER SW, POWER SW
CN7: AC IN(L), AC IN(N)
⚠ POWER SUPPLY
CN8 RED: +12V, NC, GND
CN12 WHT: +12V, +12V, +12V, +B, +B, -B, GND, GND, V.CONT, GND
CN1 WHT: +5V, +5V, GND, GND, +12.5V, GND, -12.5V, GND
CN4 WHT: +12V, +12V, GND, GND, -12V, +5V, +5V, GND, GND
CN2 WHT: +5V, +5V, +5V, +5V, +5V, GND, GND, GND, GND, GND, +12V, A-GND, A-GND, -12V
CN5 FLAT CABLE: +B SENSE, +23V, +23V, +23V, +23V, +23V, +23V, +23V, GND, GND, GND, GND, GND, GND, GND, -B SENSE

FRAME FRAME

4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

IF-19 (DATA INPUT OUTPUT)


H
G
F
E
D
C
B
A
1
2
3
ZX-35 1-704-835-11
SONY
MADE IN JAPAN
IF-19
1-641-679-11
SONY
MADE IN JAPAN
RV301
RV201
RV101
RV701
RV601
RV501
RV401
S301
S401
S801
CN101
CN102
CN301
CN302
CN401
CN402
CN403
CN404
CN501
CN502
CN601
CN602
CN701
CN702
CN801
CN802
CN304
CN303
CN103
CN104
IC101
IC201
IC301
IC401
IC501
IC601
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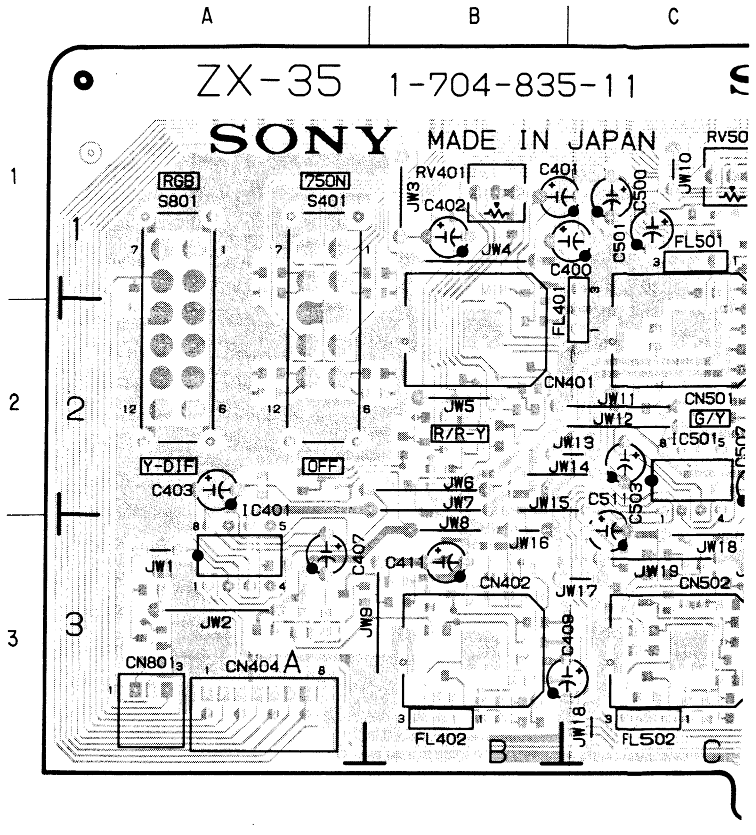
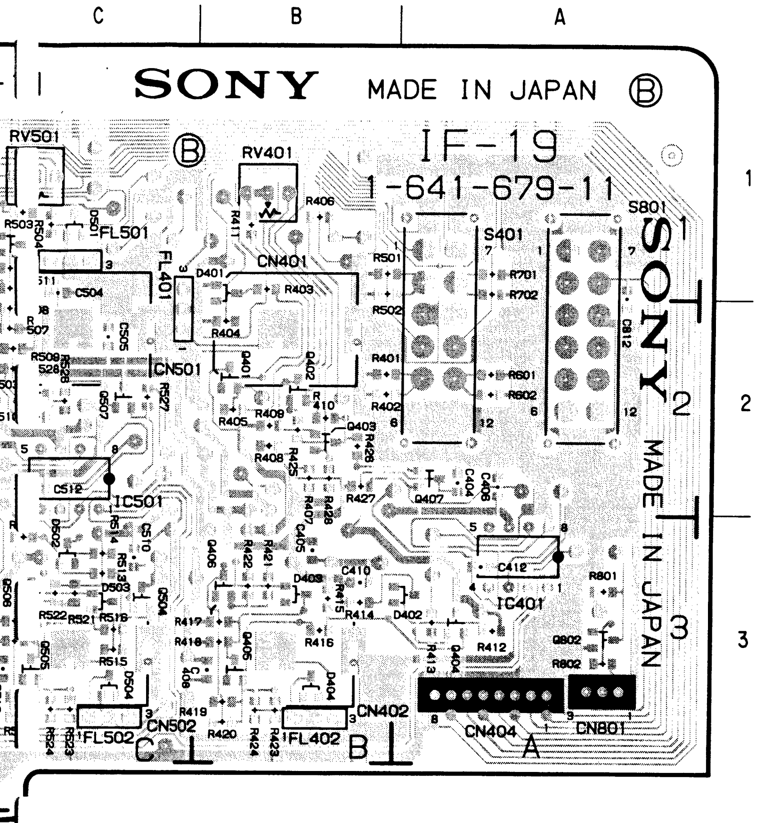
FL501
FL502
FL601
FL602
FL701
FL702

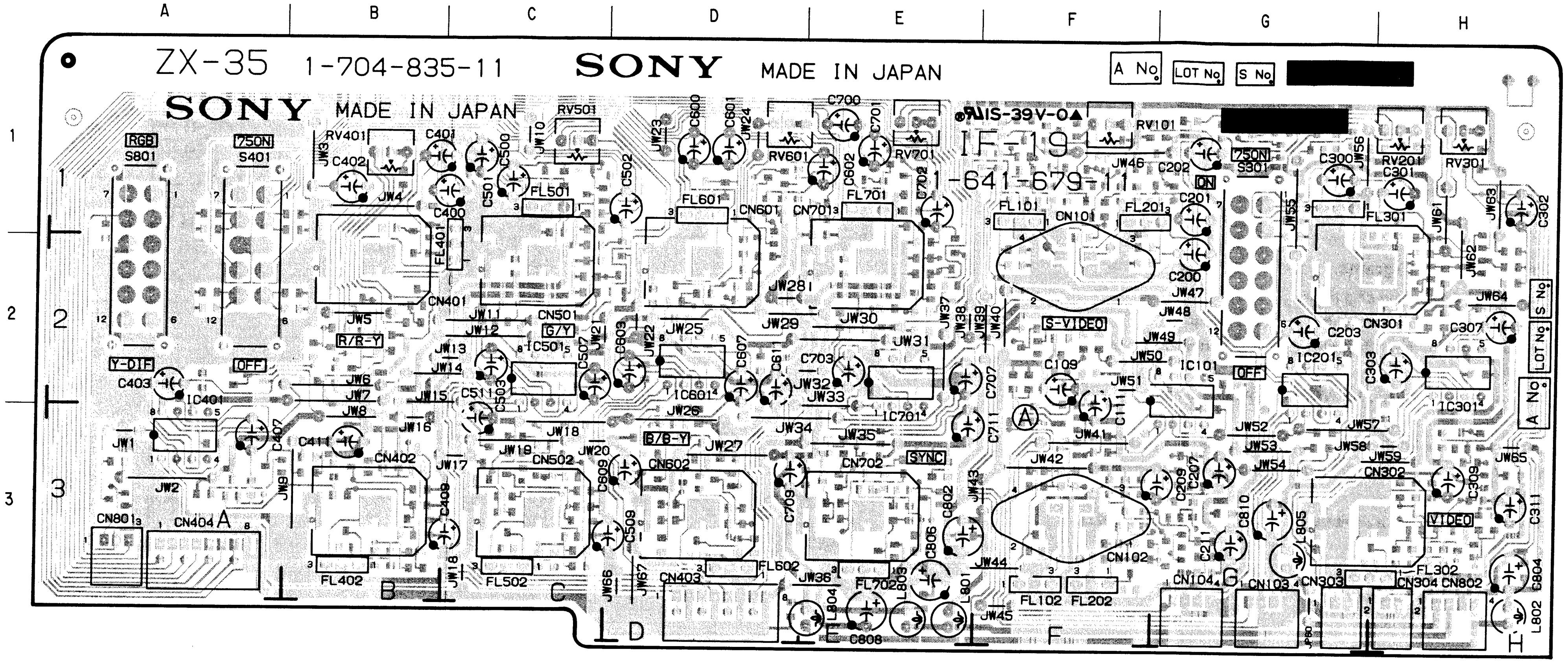

A
B
C
1
2
3
ZX-35 1-704-835-11
SONY
MADE IN JAPAN
RGB
S801
750N
S401
RV401
Y-DIF
OFF
R/R-Y
G/Y
IC401
CN401
CN402
CN404
CN801
CN501
CN502
FL401
FL402
FL501
FL502
JW1
JW2
JW3
JW4
JW5
JW6
JW7
JW8
JW9
JW10
JW11
JW12
JW13
JW14
JW15
JW16
JW17
JW18
JW19

IF-19 —SOLDERING SIDE—
1-641-679-11

IF-19	Board	
CN101	F-1	
CN102	F-3	
CN103	G-3	
CN104	G-3	
CN301	G-2	
CN302	H-3	
CN303	G-3	
CN304	H-3	
CN401	B-2	
CN402	B-3	
CN403	D-3	
CN404	A-3	
CN501	C-2	
CN502	C-3	
CN601	D-1	
CN602	D-3	
CN701	E-1	
CN702	E-3	
CN801	A-3	
CN802	H-3	
D101	F-1	S
D102	F-2	S
D103	F-3	S
D104	F-3	S
D201	G-1	S
D202	G-3	S
D203	G-3	S
D204	F-3	S
D301	H-1	S
D302	H-2	S
D303	H-3	S
D304	G-3	S
D401	B-1	S
D402	A-3	S
D403	B-3	S
D404	B-3	S
D501	C-1	S
D502	C-3	S
D503	C-3	S
D504	C-3	S
D601	D-1	S
D602	D-2	S
D603	D-3	S
D604	D-3	S
D701	E-1	S
D702	E-3	S
D703	E-3	S
D704	E-3	S
FL101	F-1	
FL102	F-3	
FL201	F-1	
FL202	F-3	
FL301	G-1	
FL302	H-3	
FL401	B-2	
FL402	B-3	
FL501	C-1	
FL502	C-3	
FL601	D-1	
FL602	D-3	
FL701	E-1	
FL702	E-3	
IC101	G-2	
IC201	G-2	
IC301	H-2	
IC401	A-2	
IC501	C-2	
IC601	D-2	
IC701	E-3	
L801	E-3	
L802	E-3	
L803	E-3	
L804	E-3	
L805	G-3	
Q101	F-1	S
Q102	F-1	S
Q103	F-1	S
Q104	F-2	S
Q105	F-3	S
Q106	F-3	S
Q107	F-1	S
Q201	G-1	S
Q202	G-1	S
Q203	G-1	S
Q204	G-3	S
Q205	F-3	S
Q206	G-3	S
Q207	G-1	S
Q301	H-1	S
Q302	H-2	S
Q303	H-2	S
Q304	H-3	S
Q305	H-3	S
Q306	H-3	S
Q307	H-2	S
Q401	B-2	S
Q402	B-2	S
Q403	B-2	S
Q404	A-3	S
Q405	B-3	S
Q406	B-3	S
Q407	A-2	S
Q501	D-1	S
Q502	D-2	S
Q503	C-2	S
Q504	C-3	S
Q505	C-3	S
Q506	C-3	S
Q507	C-2	S
Q601	D-1	S
Q602	D-1	S
Q603	D-2	S
Q604	D-3	S
Q605	D-3	S
Q606	D-3	S
Q607	D-2	S
Q701	E-1	S
Q702	E-2	S
Q703	E-2	S
Q704	E-3	S
Q705	E-3	S
Q706	E-3	S
Q707	E-2	S
Q802	A-3	S
RV101	F-1	
RV201	H-1	
RV301	H-1	
RV401	B-1	
RV501	C-1	
RV601	D-1	
RV701	E-1	
S301	G-1	
S401	A-1	
S801	A-1	

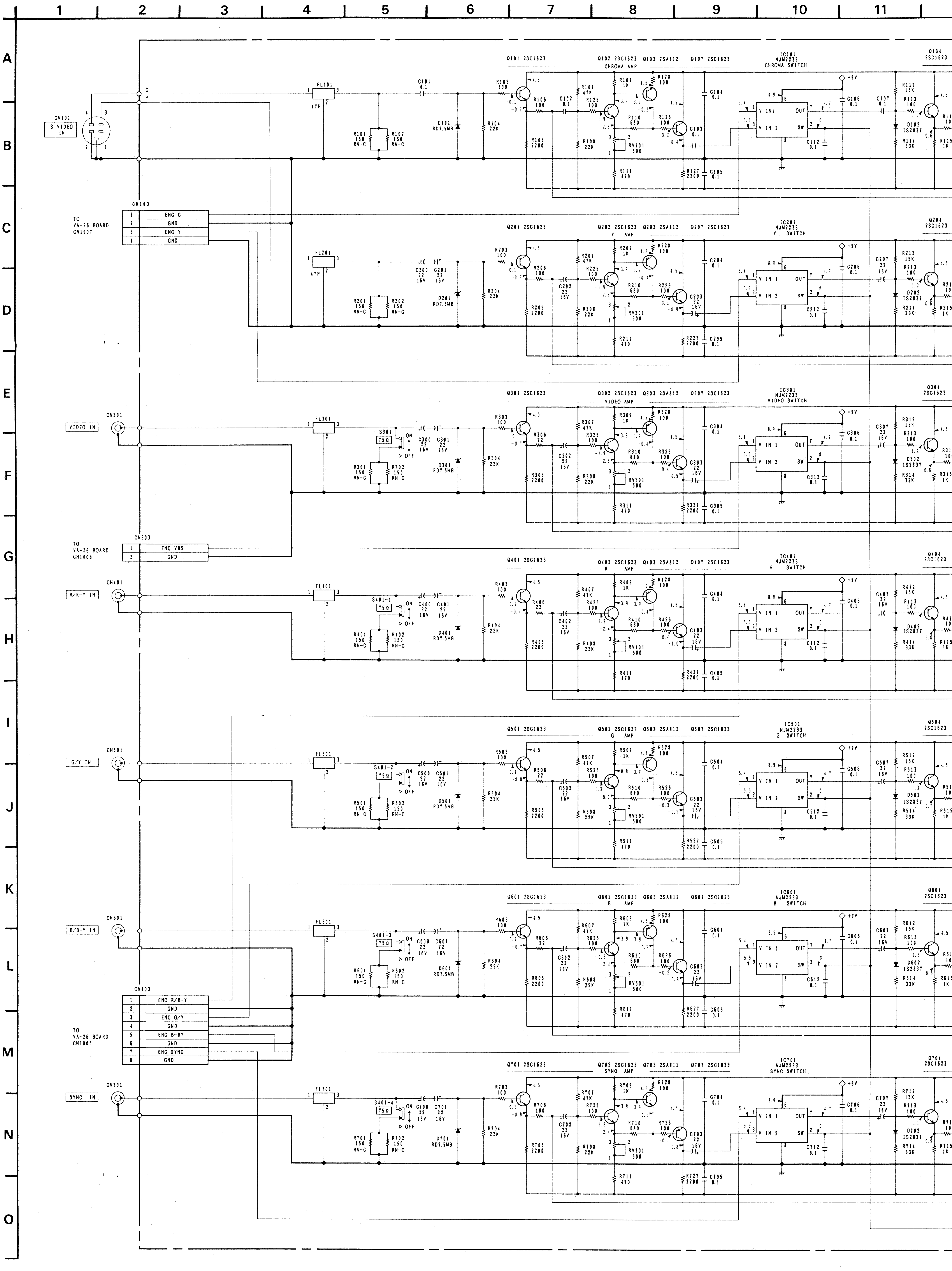

C
B
A
SONY MADE IN JAPAN Ⓑ
IF-19
1-641-679-11
RV501
RV401
S401
S801
FL501
FL401
CN401
CN501
IC501
IC401
CN402
CN404
CN801
FL502
FL402
CN502
1
2
3
MADE IN JAPAN
SONY

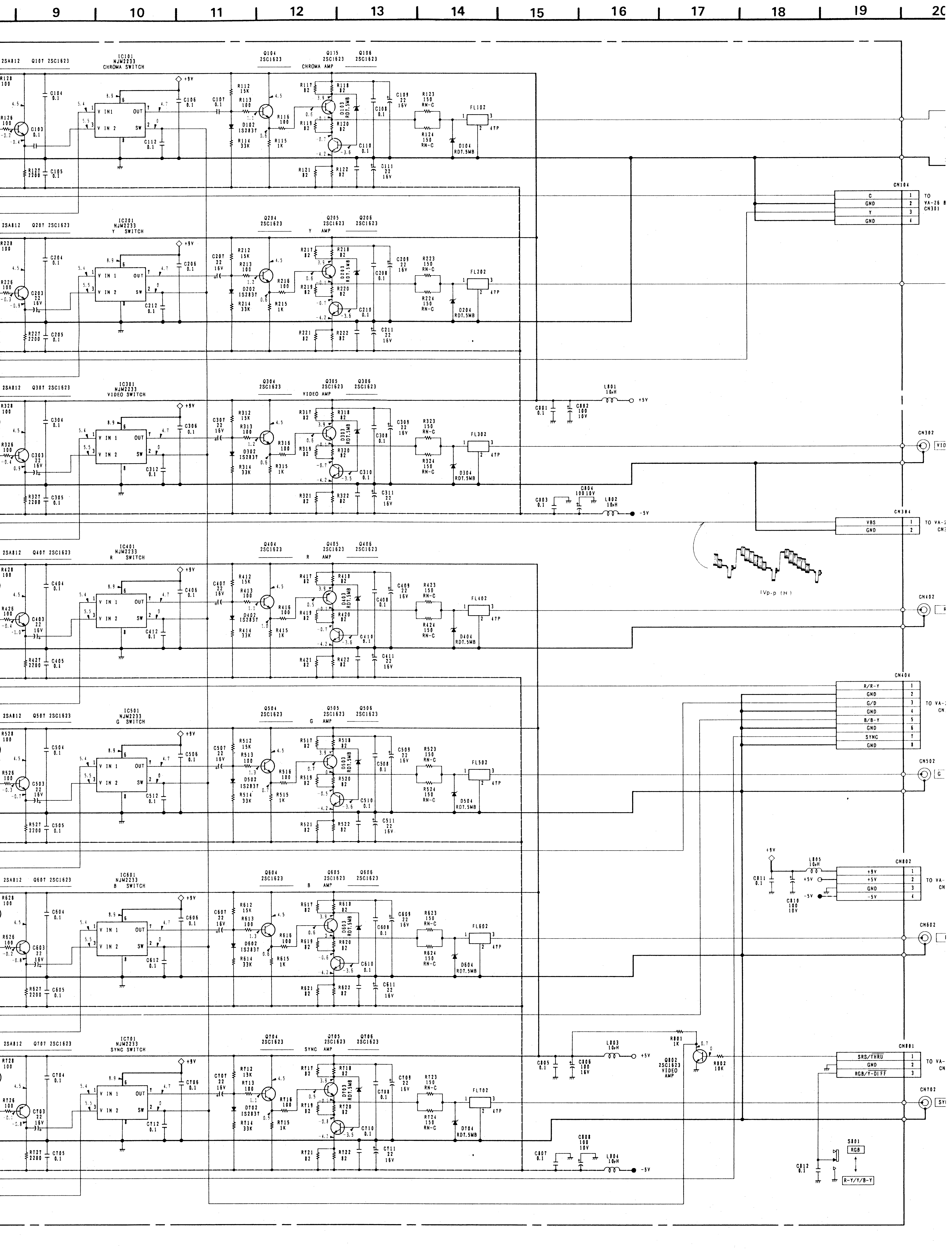
IF-19 –SOLDERING SIDE–
1-641-679-11


A
B
C
D
E
F
G
H
ZX-35 1-704-835-11
SONY MADE IN JAPAN
A No
LOT No
S No
[redacted]
SONY MADE IN JAPAN
IF-19
1-641-679-11
IS-39V-0
[redacted]
RGB
S801
750N
S401
RV401
RV501
RV601
RV701
RV101
RV201
RV301
ON
S301
Y-DIF
OFF
R/R-Y
G/Y
B/B-Y
SYNC
S-VIDEO
VIDEO
IC401
IC501
IC601
IC701
IC101
IC201
IC301
CN101
CN102
CN103
CN104
CN301
CN302
CN303
CN304
CN401
CN402
CN403
CN404
CN501
CN502
CN601
CN602
CN701
CN702
CN801
CN802
FL101
FL102
FL201
FL202
FL301
FL302
FL401
FL402
FL501
FL502
FL601
FL602
FL701
FL702
1
2
3

IF-19 –COMPONENT SIDE–
1-641-679-11

IF-19 (DATA INPUT OUTPUT)


CN101
S VIDEO IN
CN103
TO VA-26 BOARD CN1007
ENC C
GND
ENC Y
GND
CN301
VIDEO IN
CN303
TO VA-26 BOARD CN1006
ENC VBS
GND
CN401
R/R-Y IN
CN501
G/Y IN
CN601
B/B-Y IN
CN403
TO VA-26 BOARD CN1005
ENC R/R-Y
GND
ENC G/Y
GND
ENC B-BY
GND
ENC SYNC
GND
CN701
SYNC IN
FL101
FL201
FL301
FL401
FL501
FL601
FL701
4TP
S301
S401-1
S401-2
S401-3
S401-4
75Ω
ON
OFF
RDT.5MB
Q101 2SC1623
Q102 2SC1623 Q103 2SA812 Q107 2SC1623
CHROMA AMP
IC101 NJM2233 CHROMA SWITCH
Q104 2SC1623
Q201 2SC1623
Q202 2SC1623 Q203 2SA812 Q207 2SC1623
Y AMP
IC201 NJM2233 Y SWITCH
Q204 2SC1623
Q301 2SC1623
Q302 2SC1623 Q303 2SA812 Q307 2SC1623
VIDEO AMP
IC301 NJM2233 VIDEO SWITCH
Q304 2SC1623
Q401 2SC1623
Q402 2SC1623 Q403 2SA812 Q407 2SC1623
R AMP
IC401 NJM2233 R SWITCH
Q404 2SC1623
Q501 2SC1623
Q502 2SC1623 Q503 2SA812 Q507 2SC1623
G AMP
IC501 NJM2233 G SWITCH
Q504 2SC1623
Q601 2SC1623
Q602 2SC1623 Q603 2SA812 Q607 2SC1623
B AMP
IC601 NJM2233 B SWITCH
Q604 2SC1623
Q701 2SC1623
Q702 2SC1623 Q703 2SA812 Q707 2SC1623
SYNC AMP
IC701 NJM2233 SYNC SWITCH
Q704 2SC1623
V IN 1
V IN 2
OUT
SW
+9V
1S2837
RV101 500
RV201 500
RV301 500
RV401 500
RV501 500
RV601 500
RV701 500
1 2 3 4 5 6 7 8 9 10 11
A B C D E F G H I J K L M N O


9
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11
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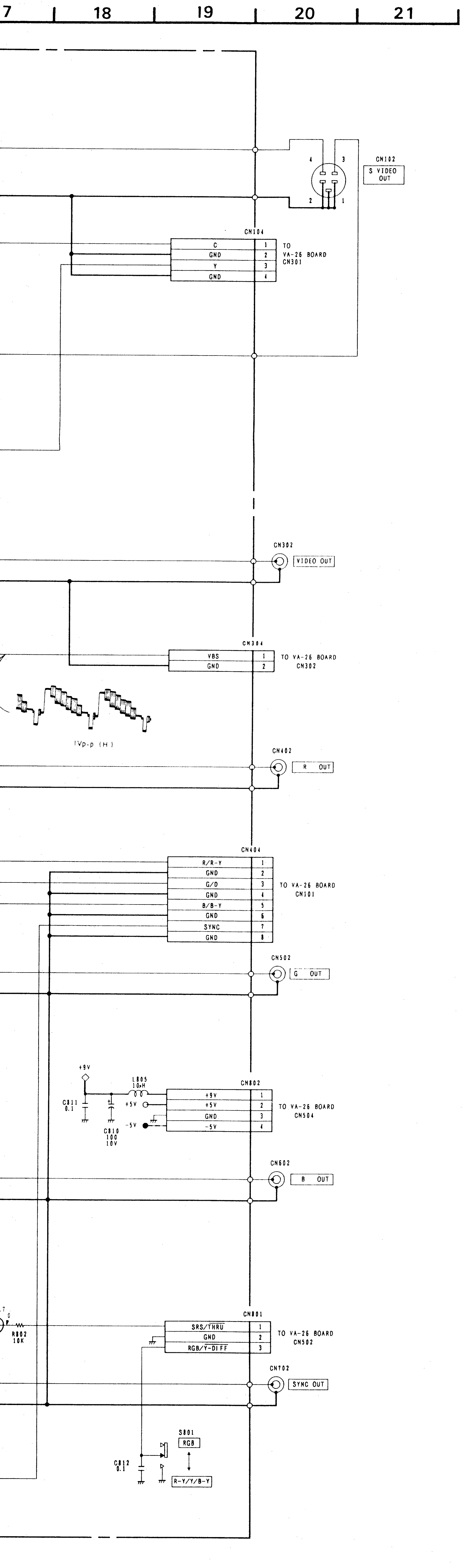
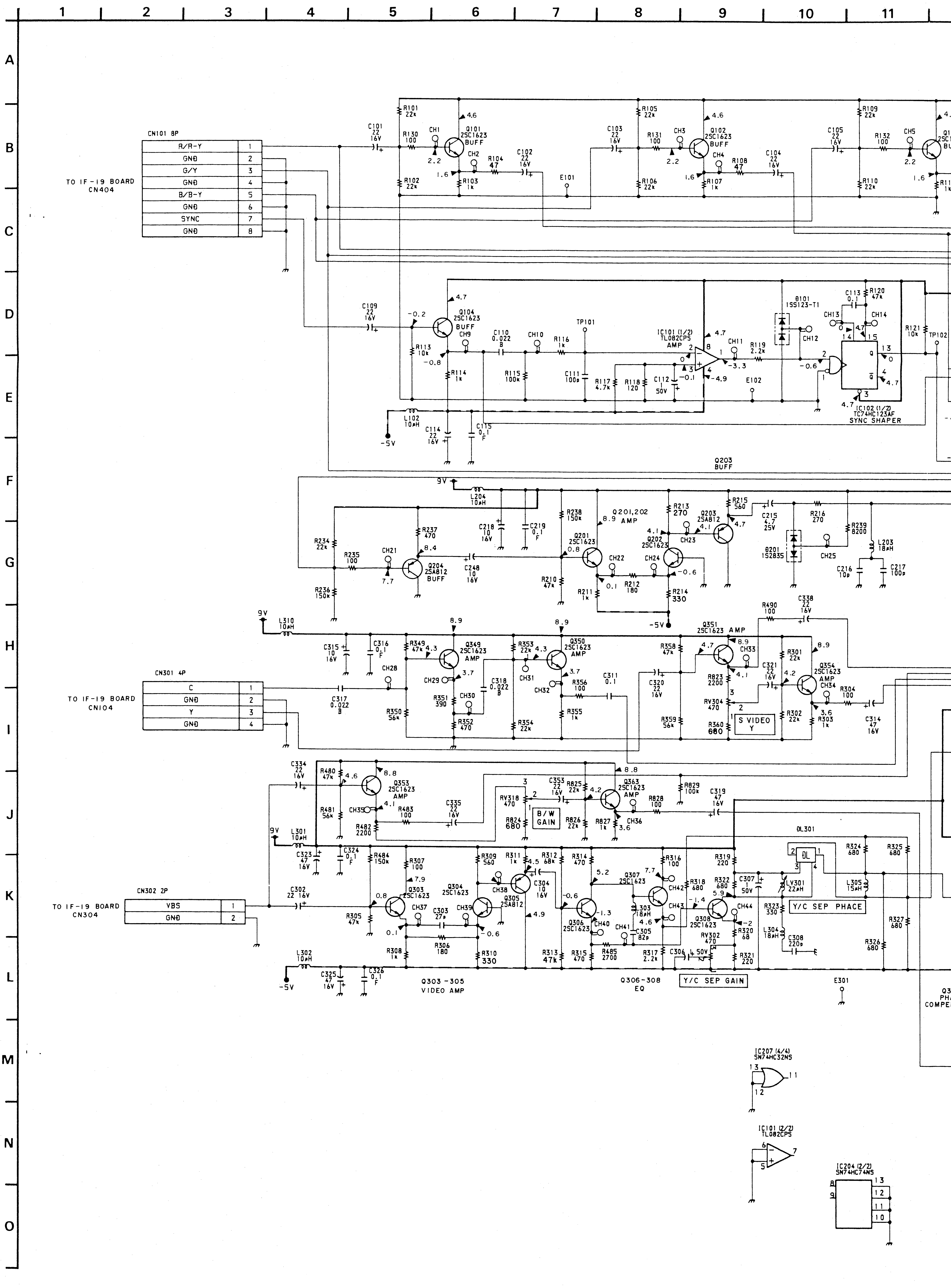
13
14
15
16
17
18
19
20
IC101 NJM2233 CHROMA SWITCH
Q104 2SC1623
Q105 2SC1623 Q106 2SC1623 CHROMA AMP
IC201 NJM2233 Y SWITCH
Q204 2SC1623
Q205 2SC1623 Q206 2SC1623 Y AMP
IC301 NJM2233 VIDEO SWITCH
Q304 2SC1623
Q305 2SC1623 Q306 2SC1623 VIDEO AMP
IC401 NJM2233 R SWITCH
Q404 2SC1623
Q405 2SC1623 Q406 2SC1623 R AMP
IC501 NJM2233 G SWITCH
Q504 2SC1623
Q505 2SC1623 Q506 2SC1623 G AMP
IC601 NJM2233 B SWITCH
Q604 2SC1623
Q605 2SC1623 Q606 2SC1623 B AMP
IC701 NJM2233 SYNC SWITCH
Q704 2SC1623
Q705 2SC1623 Q706 2SC1623 SYNC AMP
2SA812 Q107 2SC1623
V IN1
V IN 2
OUT
SW
+9V
+5V
-5V
FL102
FL202
FL302
FL402
FL502
FL602
FL702
4TP
L801 10μH
L802 10μH
L803 10μH
L804 10μH
L805 10μH
Q802 2SC1623 VIDEO AMP
R801 1K
R802 10K
CN104
C
GND
Y
GND
TO VA-26 B CN301
CN302
CN304
VBS
GND
1Vp-p (H)
CN402
CN404
R/R-Y
GND
G/D
GND
B/B-Y
GND
SYNC
GND
CN502
CN802
+9V
+5V
GND
-5V
CN602
CN801
SRS/THRU
GND
RGB/Y-DIFF
CN702
S801
RGB
R-Y/Y/B-Y


7
18
19
20
21
CN102
4
3
2
1
S VIDEO OUT
CN104
C 1
GND 2
Y 3
GND 4
TO VA-26 BOARD CN301
CN302
VIDEO OUT
CN304
VBS 1
GND 2
TO VA-26 BOARD CN302
1Vp-p (H)
CN402
R OUT
CN404
R/R-Y 1
GND 2
G/D 3
GND 4
B/B-Y 5
GND 6
SYNC 7
GND 8
TO VA-26 BOARD CN101
CN502
G OUT
+9V
L805 10μH
C811 0.1
C810 100 10V
+5V
-5V
CN802
+9V 1
+5V 2
GND 3
-5V 4
TO VA-26 BOARD CN504
CN602
B OUT
R802 10K
CN801
SRS/THRU 1
GND 2
RGB/Y-DIFF 3
TO VA-26 BOARD CN502
CN702
SYNC OUT
S801
RGB
R-Y/Y/B-Y
C812 0.1


1
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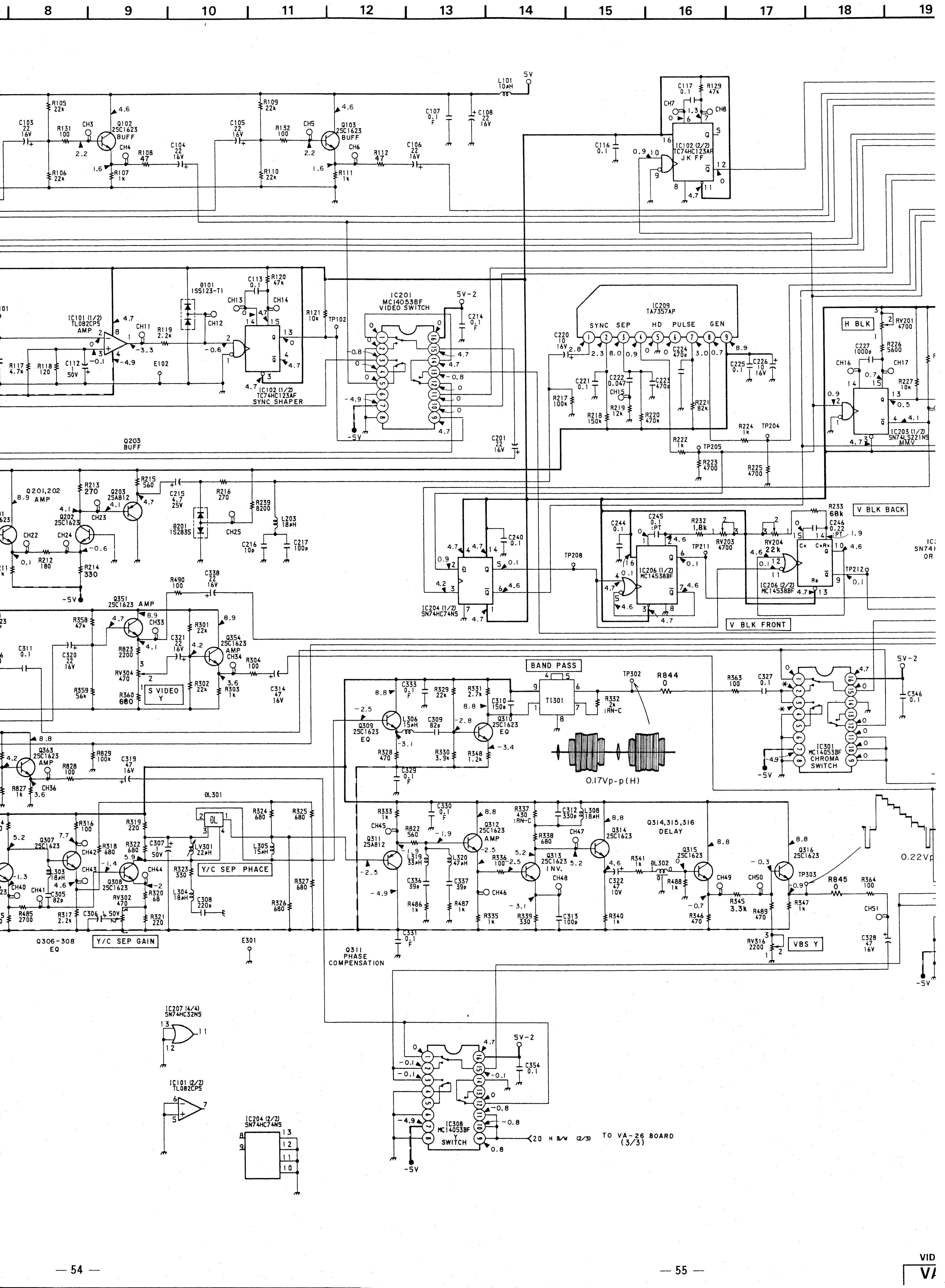
9
10
11
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
CN101 8P
TO IF-19 BOARD CN404
R/R-Y
GND
G/Y
GND
B/B-Y
GND
SYNC
GND
C101 22 16V
R101 22k
R130 100
CH1
Q101 2SC1623 BUFF
CH2
R104 47
C102 22 16V
R102 22k
R103 1k
E101
C103 22 16V
R105 22k
R131 100
CH3
Q102 2SC1623 BUFF
CH4
R108 47
C104 22 16V
R106 22k
R107 1k
C105 22 16V
R109 22k
R132 100
CH5
R110 22k
C109 22 16V
Q104 2SC1623 BUFF
CH9
R113 10k
R114 1k
C110 0.022 B
CH10
R116 1k
TP101
R115 100k
C111 100p
R117 4.7k
R118 120
C112 1 50V
IC101 (1/2) TL082CPS AMP
CH11
R119 2.2k
E102
D101 1SS123-T1
CH12
CH13
CH14
C113 0.1
R120 47k
R121 10k
TP102
IC102 (1/2) TC74HC123AF SYNC SHAPER
L102 10μH
-5V
C114 22 16V
C115 0.1 F
Q203 BUFF
9V
L204 10μH
C218 10 16V
C219 0.1 F
R238 150k
Q201,202 AMP
R213 270
Q203 2SA812
R215 560
C215 4.7 25V
R216 270
R239 8200
L203 18μH
D201 1S2835
CH25
C216 10p
C217 100p
R234 22k
R237 470
R235 100
CH21
Q204 2SA812 BUFF
C248 10 16V
Q201 2SC1623
CH22
CH24
Q202 2SC1623
CH23
R236 150k
R210 47k
R211 1k
R212 180
R214 330
L310 10μH
C315 10 16V
C316 0.1 F
R349 47k
Q349 2SC1623 AMP
R353 22k
Q350 2SC1623 AMP
R358 47k
Q351 2SC1623 AMP
CH33
R490 100
C338 22 16V
R301 22k
Q354 2SC1623 AMP
CH34
R304 100
CN301 4P
TO IF-19 BOARD CN104
C
GND
Y
GND
C317 0.022 B
CH28
CH29
CH30
R351 390
C318 0.022 B
CH31
CH32
R356 100
C311 0.1
C320 22 16V
R823 2200
C321 22 16V
RV304 470
R350 56k
R352 470
R354 22k
R355 1k
R359 56k
R360 680
S VIDEO Y
R302 22k
R303 1k
C314 47 16V
C334 22 16V
R480 47k
Q353 2SC1623 AMP
CH35
R481 56k
R483 100
C335 22 16V
R482 2200
RV318 470
B/W GAIN
R824 680
C353 22 16V
R825 22k
Q363 2SC1623 AMP
R826 22k
R827 1k
CH36
R828 100
R829 100k
C319 47 16V
L301 10μH
C323 47 16V
C324 0.1 F
R484 150k
R307 100
DL301
DL
R324 680
R325 680
L305 15μH
CN302 2P
TO IF-19 BOARD CN304
VBS
GND
C302 22 16V
Q303 2SC1623
CH37
C303 27p
Q304 2SC1623
CH39
R309 560
R311 1k
R312 68k
Q305 2SA812
CH38
C304 10 16V
R314 470
Q307 2SC1623
R316 100
R318 680
R319 220
R322 680
C307 1 50V
LV301 22μH
R323 330
Y/C SEP PHACE
R327 680
R305 47k
R306 180
Q306 2SC1623
CH40
CH41
L303 18μH
C305 82p
CH42
CH43
Q308 2SC1623
CH44
RV302 470
R320 68
L304 18μH
C308 220p
R326 680
L302 10μH
C325 47 16V
C326 0.1 F
R308 1k
R310 330
R313 47k
R315 470
R485 2700
R317 2.2k
C306 1 50V
R321 220
Q303 -305 VIDEO AMP
Q306 -308 EQ
Y/C SEP GAIN
E301
IC207 (4/4) SN74HC32NS
IC101 (2/2) TL082CPS
IC204 (2/2) SN74HC74NS


8
9
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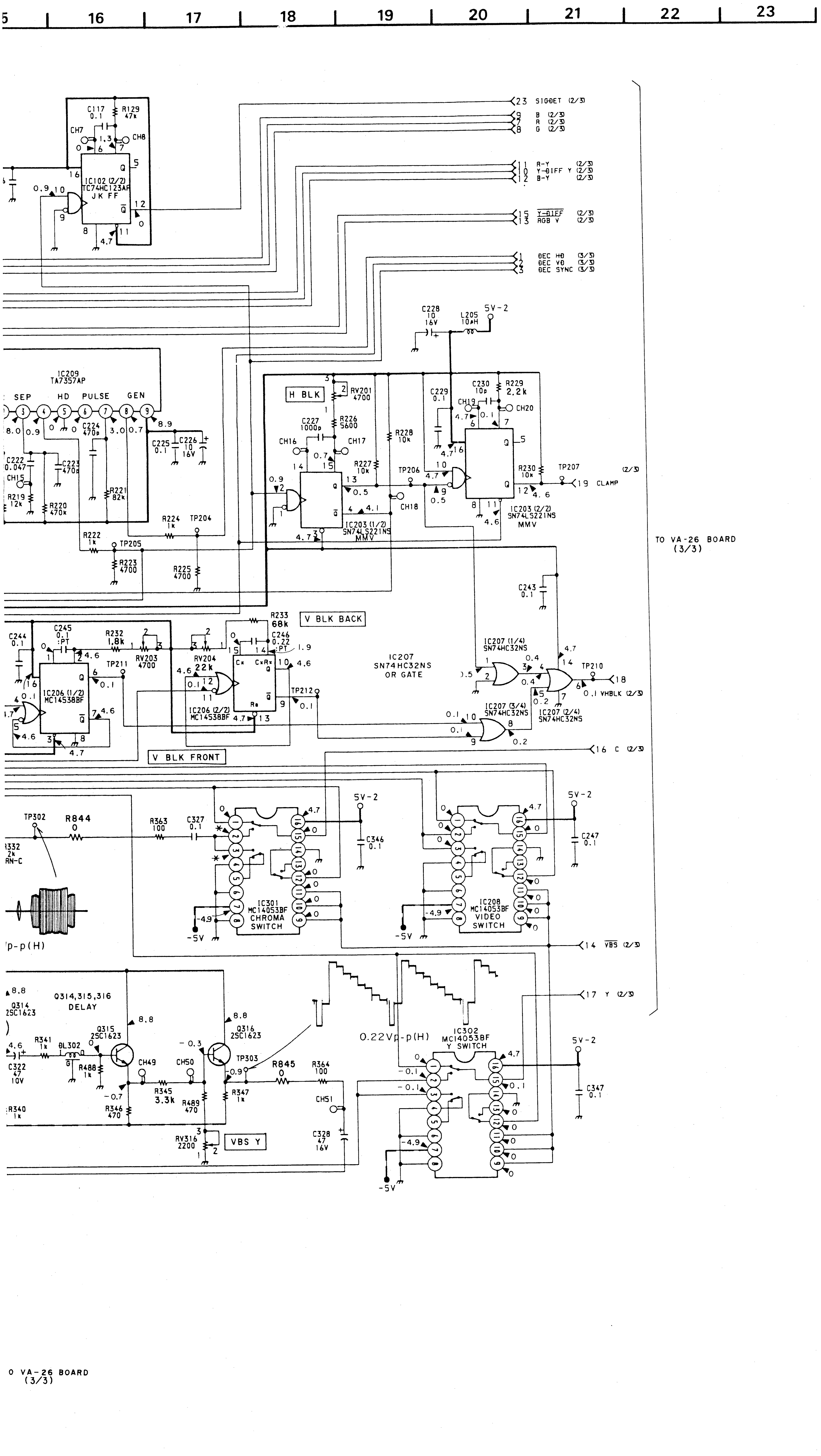
18
19
L101 10μH
5V
Q102 2SC1623 BUFF
Q103 2SC1623 BUFF
IC102 (2/2) TC74HC123AF JK FF
IC101 (1/2) TL082CPS AMP
D101 1SS123-T1
IC102 (1/2) TC74HC123AF SYNC SHAPER
IC201 MC14053BF VIDEO SWITCH
5V-2
IC209 TA7357AP
SYNC SEP
HD PULSE
GEN
H BLK
IC203 (1/2) SN74LS221NS MMV
Q203 BUFF
Q201,202 AMP
Q202 2SC1623
Q203 2SA812
D201 1S2835
-5V
IC204 (1/2) SN74HC74NS
TP208
IC206 (1/2) MC14538BF
IC206 (2/2) MC14538BF
V BLK BACK
V BLK FRONT
Q351 2SC1623 AMP
Q354 2SC1623 AMP
S VIDEO Y
BAND PASS
T1301
TP302
R844 0
Q309 2SC1623 EQ
Q310 2SC1623 EQ
0.17Vp-p(H)
IC301 MC14053BF CHROMA SWITCH
Q363 2SC1623 AMP
DL301
Y/C SEP PHACE
Y/C SEP GAIN
Q306-308 EQ
Q307 2SC1623
Q308 2SC1623
E301
Q311 2SA812
Q311 PHASE COMPENSATION
Q312 2SC1623 AMP
Q313 2SC1623 INV.
Q314 2SC1623
Q314,315,316 DELAY
Q315 2SC1623
Q316 2SC1623
DL302
TP303
R845 0
VBS Y
0.22Vp
IC207 (4/4) SN74HC32NS
IC101 (2/2) TL082CPS
IC204 (2/2) SN74HC74NS
IC308 MC14053BF Y SWITCH
20 H B/W (2/3)
TO VA-26 BOARD (3/3)
VID
VA



16
17
18
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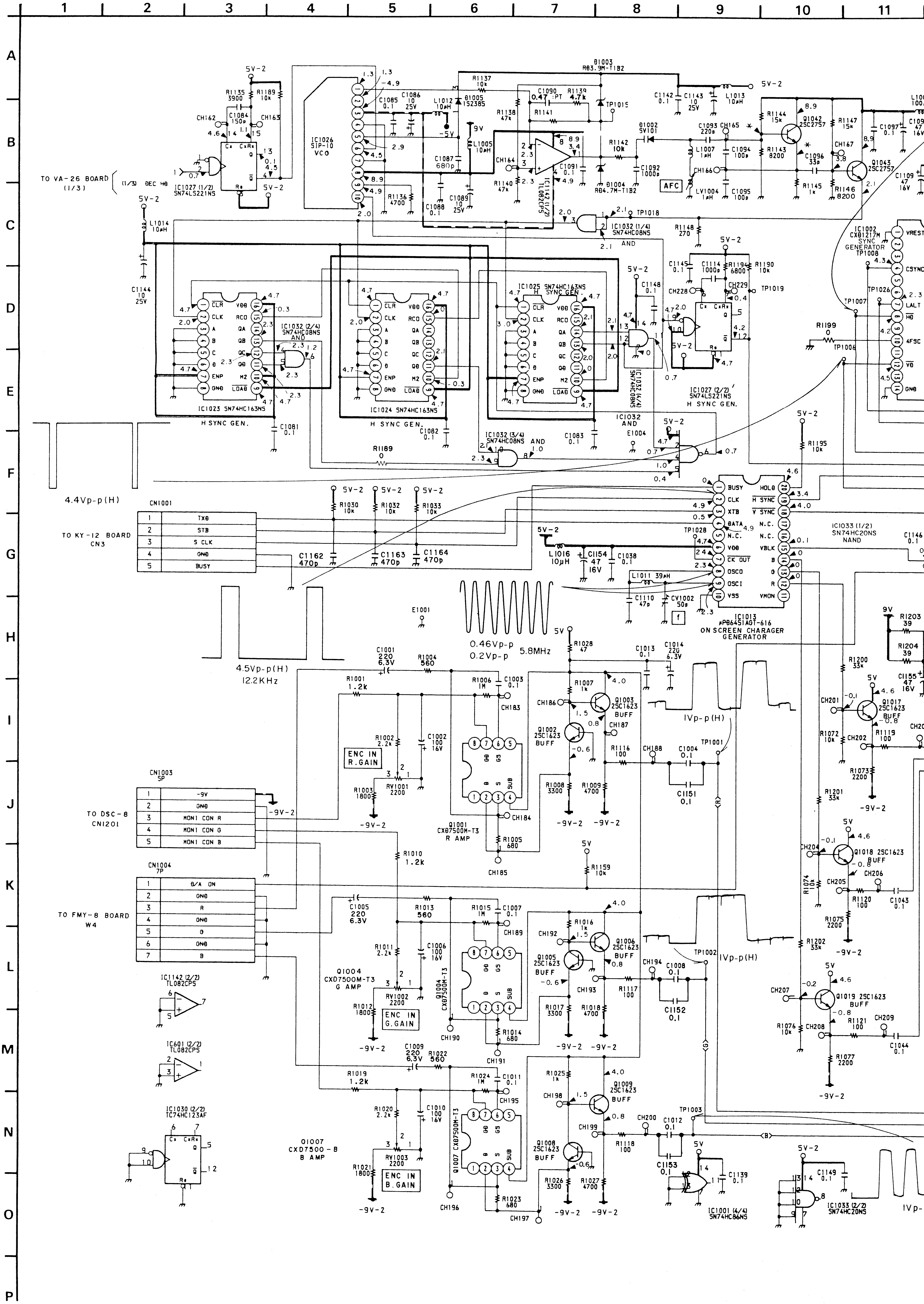
22
23
IC102 (2/2) TC74HC123AP JK FF
C117 0.1
R129 47k
CH7
CH8
SIGDET (2/3)
B (2/3)
R (2/3)
G (2/3)
R-Y (2/3)
Y-DIFF Y (2/3)
B-Y (2/3)
Y-DIFF (2/3)
RGB V (2/3)
DEC HD (3/3)
DEC VD (3/3)
DEC SYNC (3/3)
C228 10 16V
L205 10µH
5V-2
IC209 TA7357AP
SEP
HD
PULSE
GEN
H BLK
RV201 4700
C227 1000p
R226 5600
R228 10k
R227 10k
CH16
CH17
CH18
TP206
IC203 (1/2) SN74LS221NS MMV
C229 0.1
C230 10p
R229 2.2k
CH19
CH20
R230 10k
TP207
IC203 (2/2) SN74LS221NS MMV
CLAMP (2/3)
TO VA-26 BOARD (3/3)
R224 1k
TP204
R222 1k
TP205
R223 4700
R225 4700
C243 0.1
V BLK BACK
R233 68k
C246 0.22 :PT
C245 0.1 :PT
R232 1.8k
RV203 4700
RV204 22k
TP211
TP212
IC206 (1/2) MC14538BF
IC206 (2/2) MC14538BF
V BLK FRONT
IC207 SN74HC32NS OR GATE
IC207 (1/4) SN74HC32NS
IC207 (3/4) SN74HC32NS
IC207 (2/4) SN74HC32NS
TP210
VHBLK (2/3)
C (2/3)
TP302
R844 0
R363 100
C327 0.1
C346 0.1
IC301 MC14053BF CHROMA SWITCH
IC208 MC14053BF VIDEO SWITCH
C247 0.1
VBS (2/3)
Y (2/3)
Q314,315,316 DELAY
Q314 2SC1623
Q315 2SC1623
Q316 2SC1623
R341 1k
DL302
R488 1k
C322 47 10V
R340 1k
R346 470
R345 3.3k
R489 470
R347 1k
RV316 2200
VBS Y
CH49
CH50
TP303
R845 0
R364 100
CH51
C328 47 16V
0.22Vp-p(H)
IC302 MC14053BF Y SWITCH
C347 0.1
-5V
p-p(H)
O VA-26 BOARD (3/3)

VA-26 — 2/3 — (VIDEO AMP, VIDEO SWITCH)



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A
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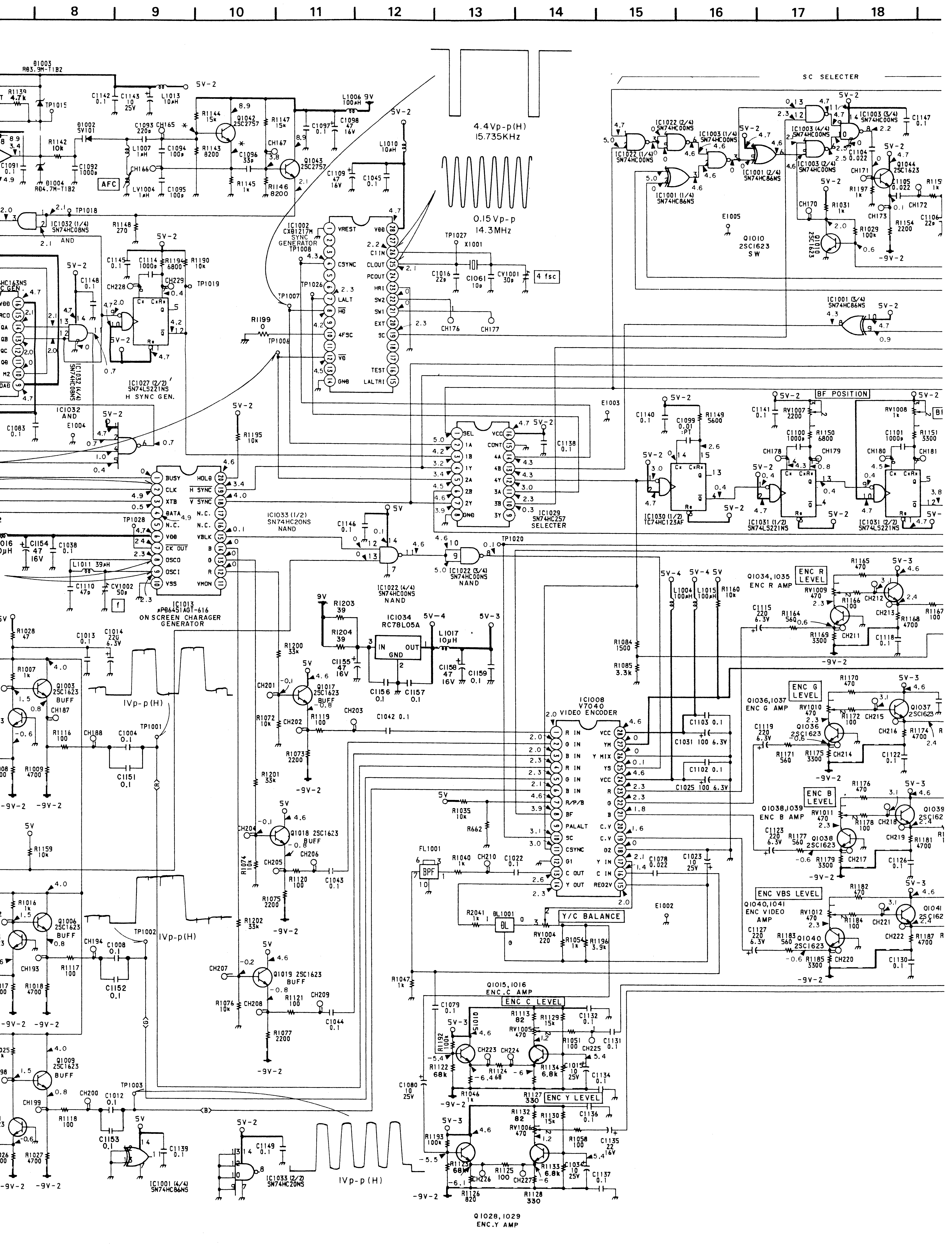
G
H
I
J
K
L
M
N
O
P
TO VA-26 BOARD (1/3)
(1/3) DEC HD
IC1027 (1/2) SN74LS221NS
R1135 3900
R1189 10k
C1084 150p
CH162
CH163
5V-2
L1014 10µH
C1144 10 25V
IC1026 SIP-10 VCO
C1085 0.1
C1086 10 25V
L1012 10µH
D1005 1S2385
R1137 10k
D1003 RD3.9M-T1B2
C1090 0.47 :PT
R1139 4.7k
TP1015
R1138 47k
R1141
9V
L1005 10µH
C1087 680p
CH164
IC1142 (1/2) TL082CPS
R1140 47k
C1091 0.1
D1004 RD4.7M-T1B2
R1136 4700
C1088 0.1
C1089 10 25V
R1142 10k
C1092 1000p
D1002 SV101
C1093 220p
CH165
L1007 1µH
C1094 100p
CH166
AFC
LV1004 1µH
C1095 100p
C1142 0.1
C1143 10 25V
L1013 10µH
R1144 15k
Q1042 2SC2757
R1147 15k
C1097 0.1
R1143 8200
C1096 33p
CH167
Q1043 2SC2757
R1145 1k
R1146 8200
C1109 47 16V
TP1018
IC1032 (1/4) SN74HC08NS AND
R1148 270
IC1002 CXB1217M SYNC GENERATOR
TP1008
VRESET
CSYNC
TP1026
LALT
HD
4FSC
VD
GND
TP1007
R1199 0
TP1006
IC1023 SN74HC163NS
H SYNC GEN.
IC1032 (2/4) SN74HC08NS AND
IC1024 SN74HC163NS
H SYNC GEN.
IC1025 SN74HC163NS H SYNC GEN.
IC1032 (4/4) SN74HC08NS
C1145 0.1
C1114 1000p
R1194 6800
R1190 10k
CH228
CH229
TP1019
C1148 0.1
IC1027 (2/2) SN74LS221NS H SYNC GEN.
CLR
CLK
A
B
C
D
ENP
GND
VDD
RCO
QA
QB
QC
QD
M2
LOAD
C1081 0.1
C1082 0.1
C1083 0.1
R1189 0
IC1032 (3/4) SN74HC08NS AND
IC1032 AND
E1004
R1195 10k
4.4Vp-p(H)
CN1001
TO KY-12 BOARD CN3
TXD
STB
S CLK
GND
BUSY
R1030 10k
R1032 10k
R1033 10k
C1162 470p
C1163 470p
C1164 470p
L1016 10µH
C1154 47 16V
C1038 0.1
TP1028
L1011 39µH
C1110 47p
CV1002 50p
IC1013 µPD6451AGT-616 ON SCREEN CHARAGER GENERATOR
BUSY
CLK
XTB
DATA
N.C.
VDD
CK OUT
OSCO
OSCI
VSS
HOLD
H SYNC
V SYNC
VBLK
VMON
IC1033 (1/2) SN74HC20NS NAND
C1146 0.1
E1001
0.46Vp-p
0.2Vp-p
5.8MHz
4.5Vp-p(H)
12.2KHz
C1001 220 6.3V
R1004 560
R1001 1.2k
R1006 1M
C1003 0.1
CH183
R1002 2.2k
C1002 100 16V
ENC IN R.GAIN
RV1001 2200
R1003 1800
Q1001 CX07500M-T3 R AMP
CH184
R1005 680
CH185
R1028 47
R1007 1k
CH186
Q1003 2SC1623 BUFF
Q1002 2SC1623 BUFF
CH187
R1116 100
CH188
C1004 0.1
TP1001
C1151 0.1
R1008 3300
R1009 4700
C1013 0.1
C1014 220 6.3V
1Vp-p(H)
CN1003 5P
TO DSC-8 CN1201
-9V
GND
MONI CON R
MONI CON G
MONI CON B
R1010 1.2k
R1159 10k
CN1004 7P
TO FMY-8 BOARD W4
B/A ON
R
G
B
C1005 220 6.3V
R1013 560
R1015 1M
C1007 0.1
CH189
R1011 2.2k
C1006 100 16V
Q1004 CXD7500M-T3 G AMP
RV1002 2200
R1012 1800
ENC IN G.GAIN
CH190
R1014 680
CH191
R1016 1k
CH192
Q1006 2SC1623 BUFF
Q1005 2SC1623 BUFF
CH193
CH194
C1008 0.1
TP1002
R1117 100
C1152 0.1
R1017 3300
R1018 4700
IC1142 (2/2) TL082CPS
IC601 (2/2) TL082CPS
IC1030 (2/2) TC74HC123AF
C1009 220 6.3V
R1022 560
R1019 1.2k
R1024 1M
C1011 0.1
CH195
R1020 2.2k
C1010 100 16V
Q1007 CXD7500-B B AMP
RV1003 2200
R1021 1800
ENC IN B.GAIN
Q1007 CXD7500M-T3
CH196
R1023 680
CH197
R1025 1k
CH198
Q1009 2SC1623 BUFF
CH199
CH200
C1012 0.1
TP1003
R1118 100
Q1008 2SC1623 BUFF
C1153 0.1
R1026 3300
R1027 4700
IC1001 (4/4) SN74HC86NS
C1139 0.1
C1149 0.1
IC1033 (2/2) SN74HC20NS
R1203 39
R1204 39
R1200 33k
C1155 47 16V
CH201
Q1017 2SC1623 BUFF
R1072 10k
CH202
R1119 100
R1073 2200
R1201 33k
CH204
Q1018 2SC1623 BUFF
CH205
CH206
R1074 10k
R1120 100
C1043 0.1
R1075 2200
R1202 33k
CH207
Q1019 2SC1623 BUFF
R1076 10k
CH208
R1121 100
CH209
C1044 0.1
R1077 2200
-9V-2


8
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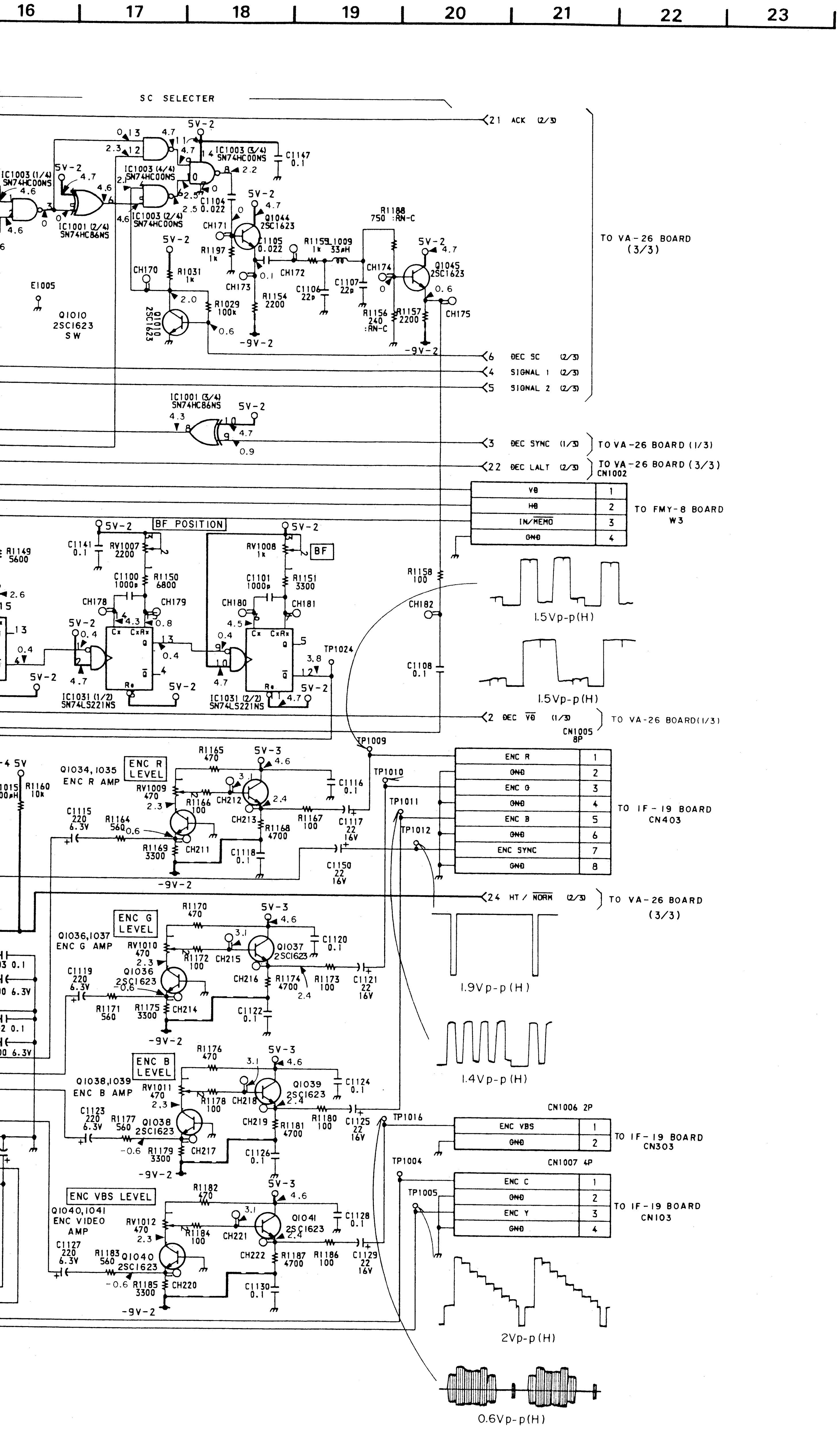
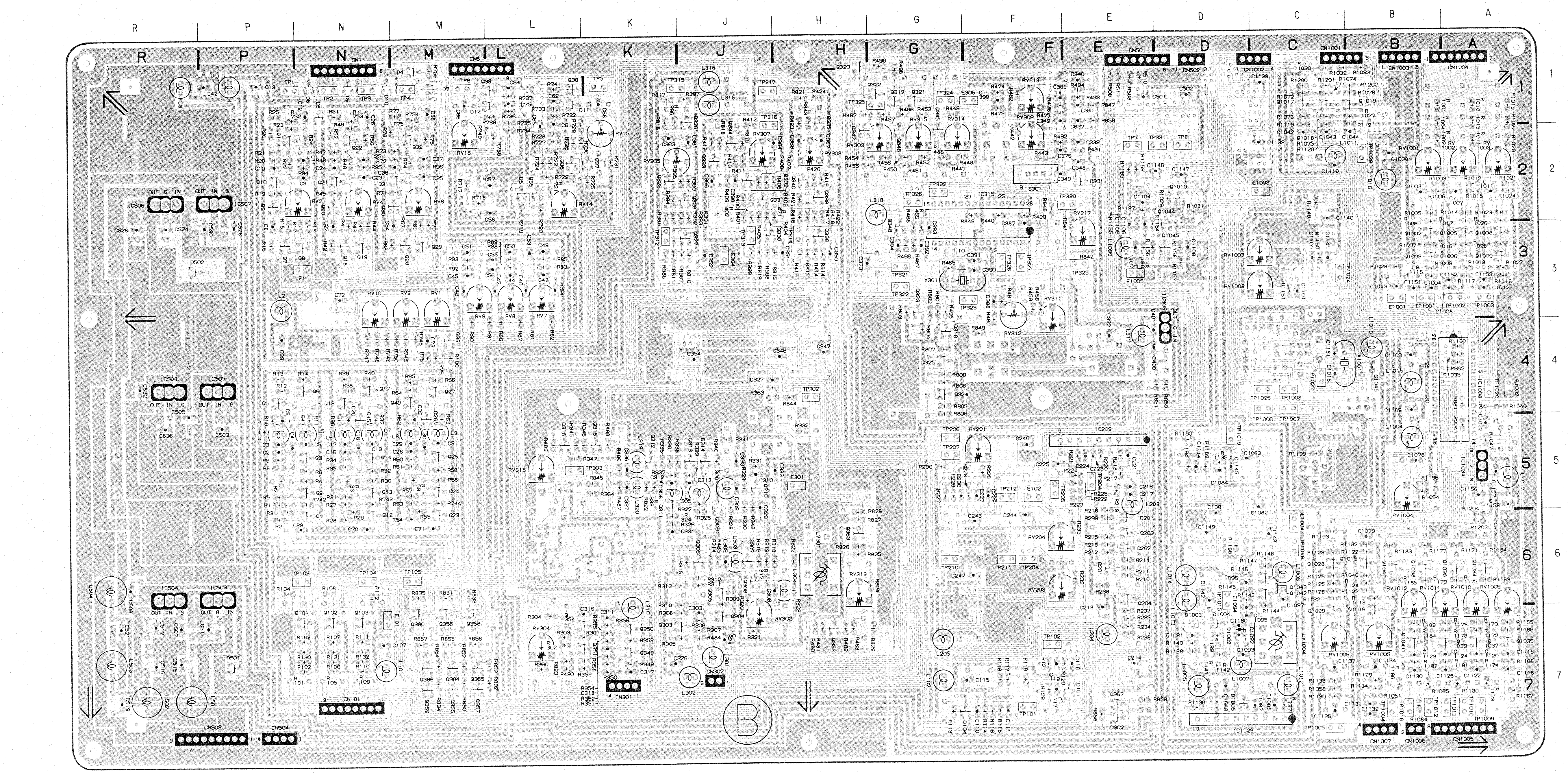
14
15
16
17
18
4.4Vp-p(H)
15.735KHz
0.15Vp-p
14.3MHz
SC SELECTER
AFC
IC1032 (1/4)
SN74HC08NS
AND
IC1032 (4/4)
SN74HC08NS
IC1027 (2/2)
SN74LS221NS
H SYNC GEN.
IC1032
AND
IC1002
CXB1217M
SYNC
GENERATOR
VREST
CSYNC
LALT
4FSC
TEST
LALTRI
CLOUT
PCOUT
X1001
4 fsc
IC1022 (1/4)
SN74HC00NS
IC1022 (2/4)
SN74HC00NS
IC1003 (1/4)
SN74HC00NS
IC1003 (4/4)
SN74HC00NS
IC1003 (2/4)
SN74HC00NS
IC1003 (3/4)
SN74HC00NS
IC1001 (1/4)
SN74HC86NS
IC1001 (2/4)
SN74HC86NS
IC1001 (3/4)
SN74HC86NS
Q1010
2SC1623
SW
Q1044
2SC1623
IC1013
μPB6451AGT-616
ON SCREEN CHARAGER
GENERATOR
BUSY
CLK
XTB
DATA
N.C.
VDD
CK OUT
OSCO
OSCI
VSS
HOLD
H SYNC
V SYNC
VBLK
VMON
IC1033 (1/2)
SN74HC20NS
NAND
IC1022 (4/4)
SN74HC00NS
NAND
IC1022 (3/4)
SN74HC00NS
NAND
IC1029
SN74HC257
SELECTER
IC1030 (1/2)
TC74HC123AF
IC1031 (1/2)
SN74LS221NS
IC1031 (2/2)
SN74LS221NS
BF POSITION
IC1034
RC78L05A
IN
OUT
GND
Q1017
2SC1623
BUFF
Q1003
2SC1623
BUFF
Q1018 2SC1623
BUFF
Q1006
2SC1623
BUFF
Q1019 2SC1623
BUFF
Q1009
2SC1623
BUFF
1Vp-p(H)
IC1008
V7040
VIDEO ENCODER
R IN
G IN
B IN
R/P/B
BF
PALALT
SC
CSYNC
G1
C OUT
Y OUT
VCC
YM
Y MIX
YS
C.Y
G2
Y IN
C IN
REG2V
FL1001
BPF
DL1001
Y/C BALANCE
ENC R
LEVEL
Q1034,1035
ENC R AMP
ENC G
LEVEL
Q1036,1037
ENC G AMP
ENC B
LEVEL
Q1038,1039
ENC B AMP
ENC VBS LEVEL
Q1040,1041
ENC VIDEO
AMP
Q1015,1016
ENC.C AMP
ENC C LEVEL
ENC Y LEVEL
Q1028,1029
ENC.Y AMP
IC1001 (4/4)
SN74HC86NS
IC1033 (2/2)
SN74HC20NS
5V-2
-9V-2
5V-3
5V-4
9V
TP1015
TP1018
TP1019
TP1008
TP1026
TP1007
TP1006
TP1027
TP1028
TP1020
TP1001
TP1002
TP1003
E1003
E1004
E1005
E1002


16
17
18
19
20
21
22
23
SC SELECTER
21 ACK (2/3)
IC1003 (3/4) SN74HC00NS
IC1003 (4/4) SN74HC00NS
IC1003 (1/4) SN74HC00NS
IC1003 (2/4) SN74HC00NS
IC1001 (2/4) SN74HC86NS
C1147 0.1
C1104 0.022
Q1044 2SC1623
R1188 750 :RN-C
C1105 0.022
R1155 1k
L1009 33µH
Q1045 2SC1623
CH171
CH172
CH173
CH174
CH175
R1197 1k
R1031 1k
CH170
E1005
Q1010 2SC1623 SW
R1029 100k
R1154 2200
C1106 22p
C1107 22p
R1156 240 :RN-C
R1157 2200
5V-2
-9V-2
TO VA-26 BOARD (3/3)
6 DEC SC (2/3)
4 SIGNAL 1 (2/3)
5 SIGNAL 2 (2/3)
IC1001 (3/4) SN74HC86NS
3 DEC SYNC (1/3)
TO VA-26 BOARD (1/3)
22 DEC LALT (2/3)
TO VA-26 BOARD (3/3)
CN1002
VD 1
HD 2
IN/MEMO 3
GND 4
TO FMY-8 BOARD W3
BF POSITION
BF
R1149 5600
C1141 0.1
RV1007 2200
RV1008 1k
C1100 1000p
R1150 6800
C1101 1000p
R1151 3300
CH178
CH179
CH180
CH181
R1158 100
CH182
C1108 0.1
IC1031 (1/2) SN74LS221NS
IC1031 (2/2) SN74LS221NS
TP1024
1.5Vp-p(H)
1.5Vp-p(H)
2 DEC VD (1/3)
TO VA-26 BOARD(1/3)
CN1005 8P
TP1009
TP1010
TP1011
TP1012
ENC R 1
GND 2
ENC G 3
GND 4
ENC B 5
GND 6
ENC SYNC 7
GND 8
TO IF-19 BOARD CN403
-4 5V
L1015 100µH
R1160 10k
Q1034, 1035 ENC R AMP
ENC R LEVEL
RV1009 470
R1165 470
5V-3
CH212
R1166 100
C1116 0.1
C1115 220 6.3V
R1164 560
R1169 3300
CH211
CH213
R1168 4700
R1167 100
C1117 22 16V
C1118 0.1
C1150 22 16V
24 HT / NORM (2/3)
TO VA-26 BOARD (3/3)
1.9Vp-p(H)
ENC G LEVEL
Q1036,1037 ENC G AMP
RV1010 470
R1170 470
Q1037 2SC1623
C1120 0.1
R1172 100
CH215
Q1036 2SC1623
C1119 220 6.3V
CH216
R1174 4700
R1173 100
C1121 22 16V
R1171 560
R1175 3300
CH214
C1122 0.1
1.4Vp-p(H)
ENC B LEVEL
Q1038,1039 ENC B AMP
RV1011 470
R1176 470
Q1039 2SC1623
C1124 0.1
R1178 100
CH218
C1123 220 6.3V
R1177 560
Q1038 2SC1623
CH219
R1181 4700
R1180 100
C1125 22 16V
R1179 3300
CH217
C1126 0.1
CN1006 2P
TP1016
ENC VBS 1
GND 2
TO IF-19 BOARD CN303
TP1004
CN1007 4P
TP1005
ENC C 1
GND 2
ENC Y 3
GND 4
TO IF-19 BOARD CN103
ENC VBS LEVEL
Q1040,1041 ENC VIDEO AMP
RV1012 470
R1182 470
Q1041 2SC1623
C1128 0.1
R1184 100
CH221
C1127 220 6.3V
R1183 560
Q1040 2SC1623
CH222
R1187 4700
R1186 100
C1129 22 16V
R1185 3300
CH220
C1130 0.1
2Vp-p(H)
0.6Vp-p(H)

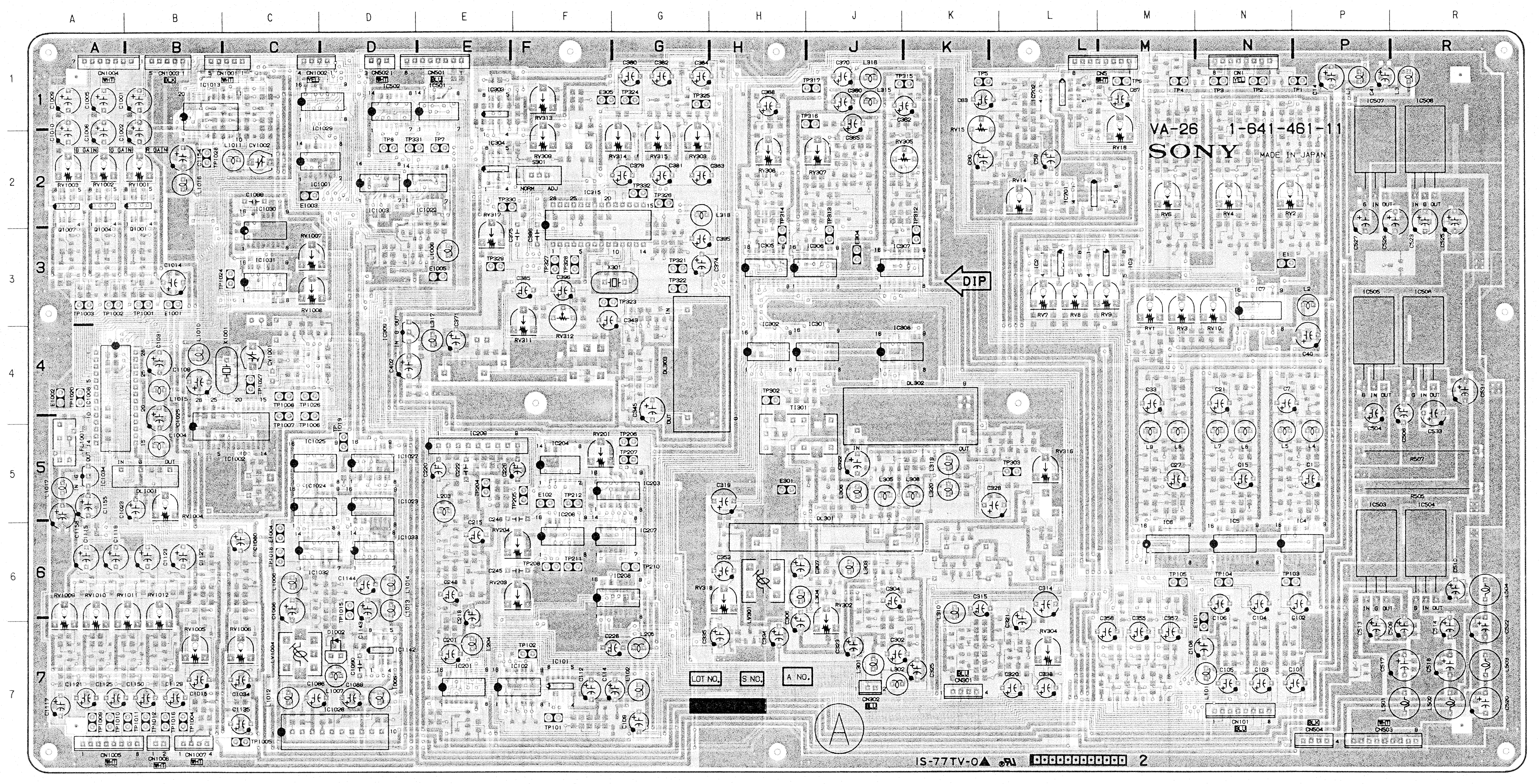
VA-26 (VIDEO AMP, VIDEO SWITCH)



VA-26 –SOLDERING SIDE–
1-641-461-11

VA-26 Board

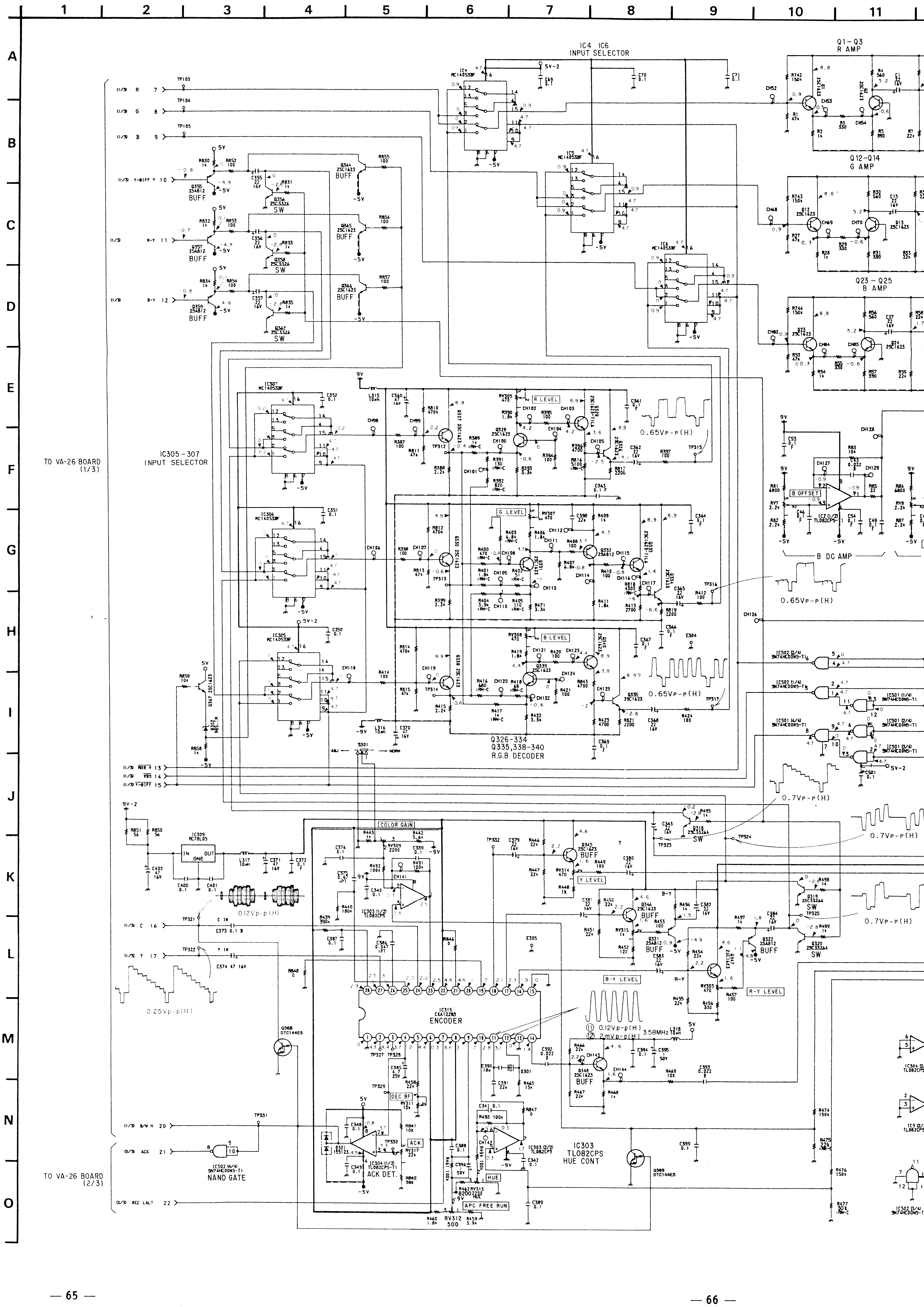
CN1	N-1	
CN5	M-1	
CN101	N-7	
CN301	K-7	
CN302	J-7	
CN501	E-1	
CN502	D-1	
CN503	P-7	
CN504	P-7	
CN1001	B-1	
CN1002	C-1	
CN1003	B-1	
CN1004	A-1	
CN1005	A-7	
CN1006	B-7	
CN1007	B-7	
CV1001	C-4	
CV1002	C-2	
D4	M-1	S
D5	L-2	S
D6	N-1	S
D7	M-1	S
D8	N-1	S
D9	N-1	S
D10	N-1	S
D11	L-1	S
D12	M-1	S
D101	E-7	S
D201	E-6	S
D301	E-2	S
D302	E-7	S
D501	P-7	S
D502	R-3	S
D1002	D-7	
D1003	D-7	S
D1004	D-7	S
D1005	D-7	S
DL301	J-5	
DL302	K-4	
DL303	G-4	
DL1001	B-5	
E1	N-3	
E101	M-7	
E102	F-5	
E301	H-5	
E304	J-3	
E305	F-1	
E1001	B-3	
E1002	A-4	
E1003	C-2	
E1004	C-6	
E1005	E-3	
FL1001	A-5	
IC2	L-3	
IC3	M-3	
IC4	P-6	
IC5	N-6	
IC6	M-6	
IC7	N-3	
IC101	F-7	
IC102	F-7	
IC201	E-7	
IC203	G-5	
IC204	F-5	
IC206	F-5	
IC207	G-6	
IC208	G-6	
IC209	E-5	
IC301	J-4	
IC302	H-4	
IC303	E-1	
IC304	E-1	
IC305	H-3	
IC306	J-3	
IC307	J-3	
IC308	J-4	
IC309	D-4	
IC315	F-2	
IC501	E-1	
IC502	D-1	
IC503	P-5	
IC504	R-5	
IC505	P-3	
IC506	R-1	
IC507	P-1	
IC508	R-3	
IC701	L-2	
IC702	L-1	
IC1001	C-2	
IC1002	C-5	
IC1003	D-2	
IC1008	A-4	
IC1013	B-1	
IC1022	E-2	
IC1023	D-5	
IC1024	C-5	
IC1025	C-5	
IC1026	D-7	
IC1027	D-5	
IC1029	C-1	
IC1030	C-2	
IC1031	C-3	
IC1032	C-6	
IC1033	D-6	
IC1034	A-5	
IC1142	D-7	
Q1	N-5	S
Q2	N-5	S
Q3	N-5	S
Q4	N-4	S
Q5	P-4	S
Q6	N-3	S
Q7	P-3	S
Q8	N-3	S
Q9	P-2	S
Q10	P-2	S
Q11	P-1	S
Q12	N-5	S
Q13	N-5	S
Q14	N-5	S
Q15	N-4	S
Q16	N-4	S
Q17	N-4	S
Q18	N-3	S
Q19	N-3	S
Q20	N-2	S
Q21	N-2	S
Q22	N-2	S
Q23	M-5	S
Q24	M-5	S
Q25	M-5	S
Q26	M-4	S
Q27	M-4	S
Q28	M-3	S
Q29	M-3	S
Q30	N-2	S
Q31	N-2	S
Q32	M-2	S
Q33	M-4	S
Q35	L-2	S
Q36	L-2	S
Q37	K-2	S
Q38	L-1	S
Q39	M-1	S
Q40	N-4	S
Q101	P-6	S
Q102	N-6	S
Q103	N-6	S
Q104	G-7	S
Q201	E-6	S
Q202	E-6	S
Q203	E-6	S
Q204	E-6	S
Q303	K-7	S
Q304	J-7	S
Q306	J-6	S
Q307	J-6	S
Q308	J-6	S
Q309	J-6	S
Q310	J-5	S
Q311	K-5	S
Q312	K-5	S
Q313	J-5	S
Q314	J-5	S
Q315	K-5	S
Q316	L-5	S
Q318	G-4	S
Q319	G-1	S
Q320	H-1	S
Q321	G-1	S
Q322	G-1	S
Q323	G-3	S
Q324	G-4	S
Q325	G-4	S
Q326	J-1	S
Q327	J-3	S
Q328	J-2	S
Q329	K-2	S
Q330	H-3	S
Q331	J-2	S
Q332	H-2	S
Q333	J-2	S
Q334	J-1	S
Q335	H-1	S
Q338	H-3	S
Q339	H-2	S
Q340	H-2	S
Q345	G-1	S
Q346	G-2	S
Q347	H-1	S
Q348	G-2	S
Q349	K-7	S
Q350	K-7	S
Q351	K-7	S
Q353	H-7	S
Q354	L-7	S
Q355	M-7	S
Q356	M-7	S
Q357	M-7	S
Q358	M-7	S
Q359	M-7	S
Q360	M-7	S
Q363	H-6	S
Q364	M-7	S
Q365	M-7	S
Q366	M-7	S
Q367	E-7	S
Q1001	B-3	
Q1002	B-3	S



VA-26 —COMPONENT SIDE—
1-641-461-11

● ▨ : Conductor side pattern
● ▨ : Component side pattern

	B-3	S
	A-3	
	A-3	S
	A-3	S
	A-3	
	A-3	S
	A-3	S
	D-2	S
	C-6	S
	B-7	S
	C-1	S
	C-2	S
	B-1	S
	C-6	S
	C-7	S
	A-6	S
	A-7	S
	B-6	S
Q1037	A-7	S
Q1038	B-6	S
Q1039	A-7	S
Q1040	B-6	S
Q1041	B-7	S
Q1042	C-6	S
Q1043	C-6	S
Q1044	D-2	S
Q1045	D-3	S
RV1	M-4	
RV2	N-2	
RV3	M-4	
RV4	N-2	
RV6	M-2	
RV7	L-3	
RV8	L-3	
RV9	M-3	
RV10	N-4	
RV14	L-2	
RV15	K-2	
RV16	M-2	
RV201	F-5	
RV203	E-6	
RV204	E-6	
RV302	J-6	
RV303	G-2	
RV304	L-7	
RV305	J-2	
RV307	J-2	
RV308	H-2	
RV309	F-2	
RV311	F-4	
RV312	F-4	
RV313	F-1	
RV314	G-2	
RV315	G-2	
RV316	L-5	
RV317	E-2	
RV318	G-6	
RV1001	B-2	
RV1002	A-2	
RV1003	A-2	
RV1004	B-5	
RV1005	B-7	
RV1006	C-7	
RV1007	C-3	
RV1008	C-3	
RV1009	A-6	
RV1010	A-6	
RV1011	A-6	
RV1012	B-6	
S301	F-2	
TI301	H-5	
TP1	P-1	
TP2	N-1	
TP3	N-1	
TP4	M-1	
TP5	K-1	
TP6	M-1	
TP7	E-2	
TP8	D-2	
TP101	F-7	
TP102	F-7	
TP103	N-6	
TP104	N-6	
TP105	M-6	
TP204	E-5	
TP205	F-5	
TP206	G-5	
TP207	G-5	
TP208	F-6	
TP210	G-6	
TP211	F-6	
TP212	F-5	
TP302	H-4	
TP303	L-5	
TP312	K-2	
TP313	J-2	
TP314	H-2	
TP315	J-1	
TP316	J-1	
TP317	J-1	
TP321	G-3	
TP322	G-3	
TP323	G-3	
TP324	G-1	
TP325	G-1	
TP326	G-2	
TP327	F-3	
TP328	F-3	
TP329	E-3	
TP330	E-2	
TP331	D-2	
TP601	C-3	
TP1001	B-3	
TP1002	A-3	
TP1003	A-3	
TP1004	B-7	
TP1005	C-7	
TP1006	C-5	
TP1007	C-5	
TP1008	C-4	
TP1009	A-7	
TP1010	A-7	
TP1011	B-7	
TP1012	B-7	
TP1015	D-7	
TP1016	B-7	
TP1018	C-6	
TP1019	D-5	
TP1020	A-4	
TP1024	B-3	
TP1026	C-4	
TP1027	C-4	
TP1028	B-2	
X301	F-3	
X1001	C-4	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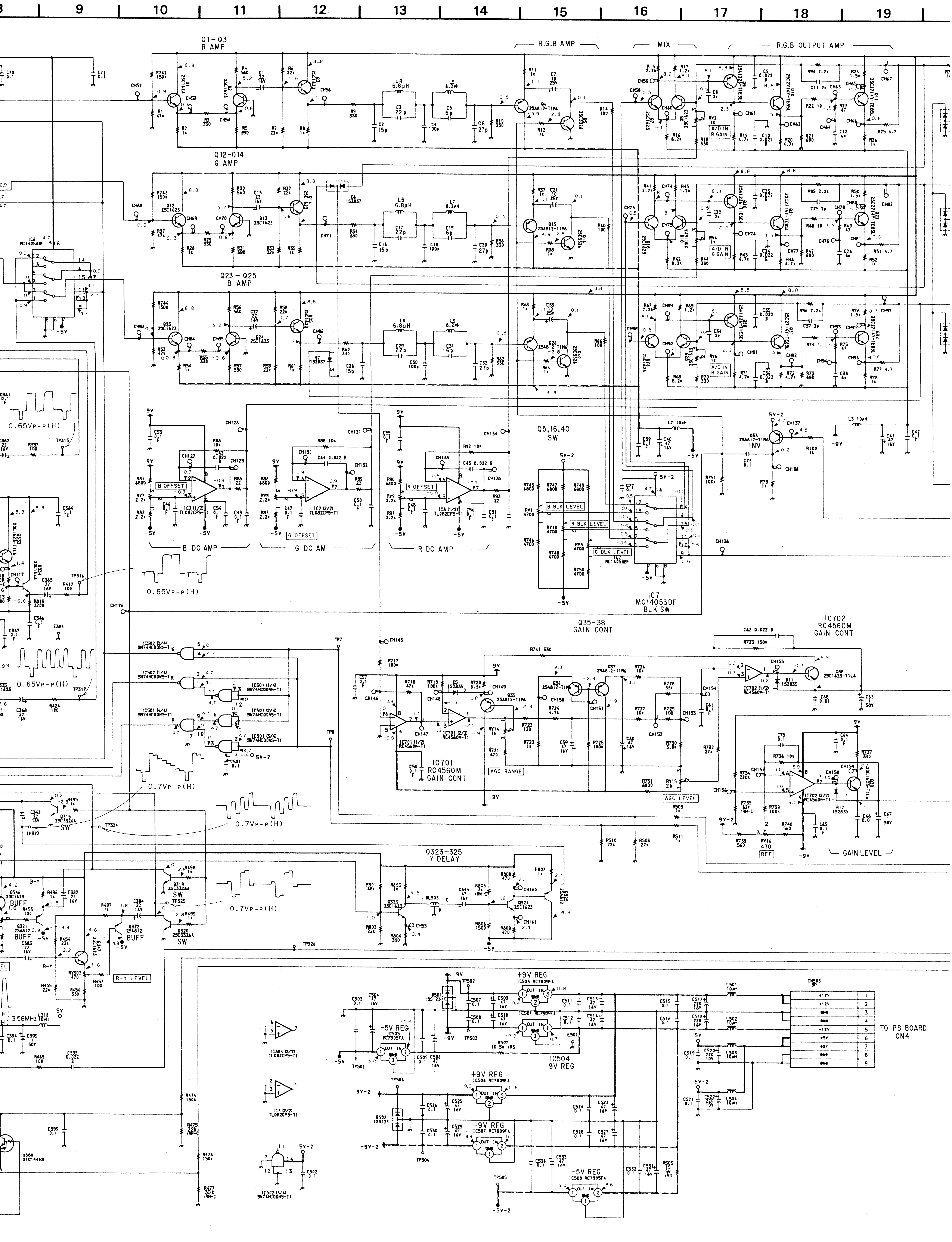
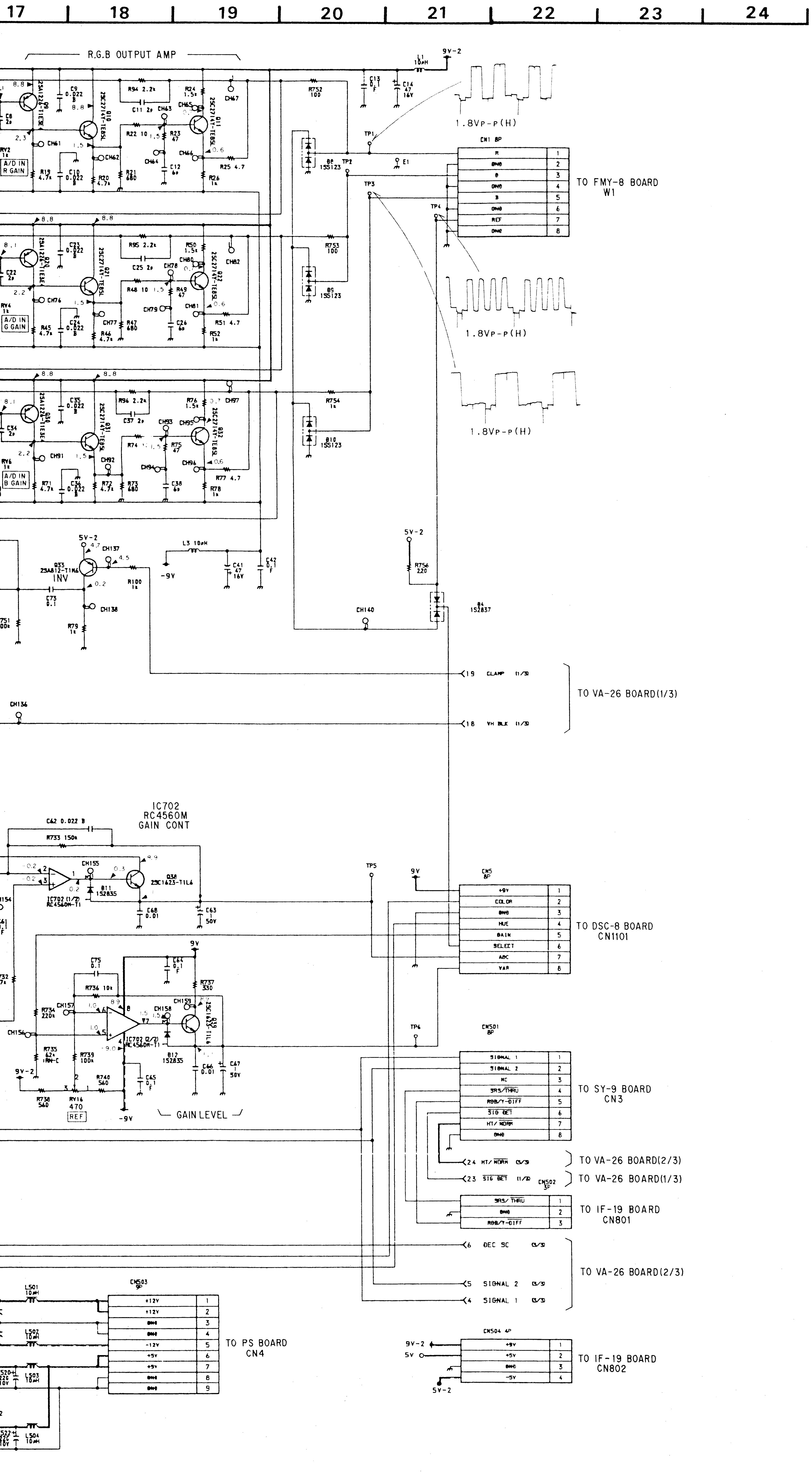
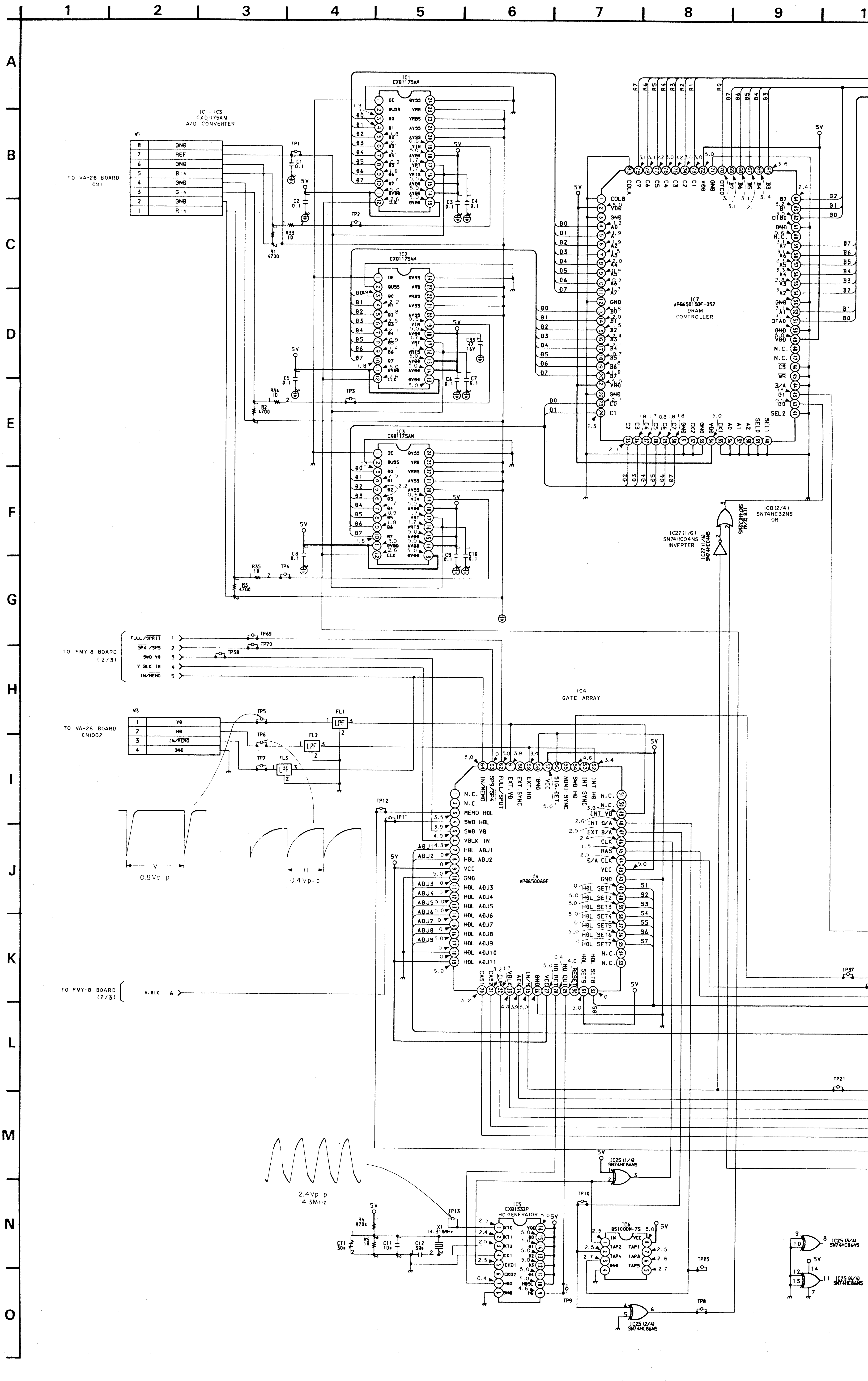
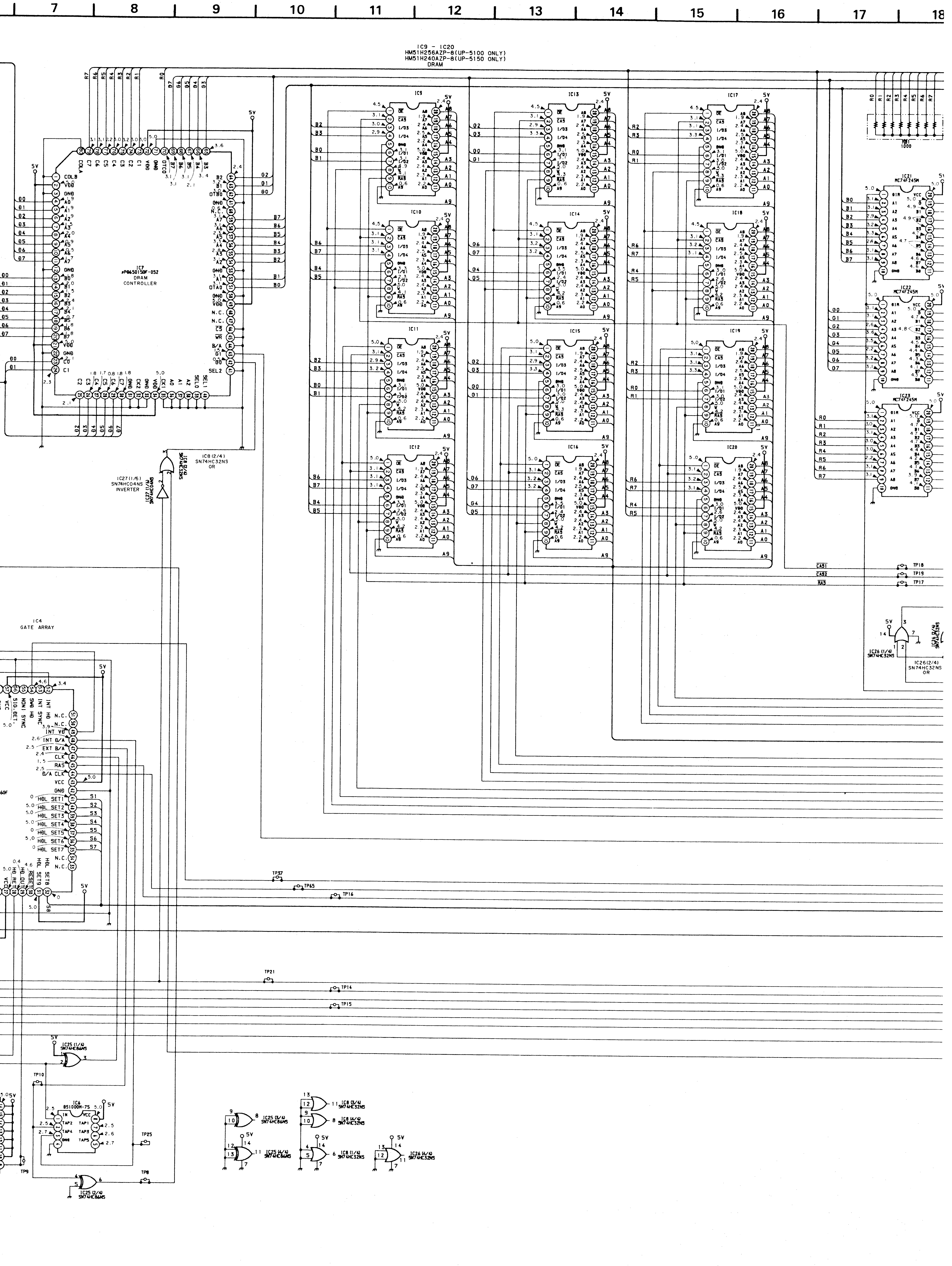
9
10
11
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
IC4 IC6
INPUT SELECTOR
Q1–Q3
R AMP
Q12–Q14
G AMP
Q23 – Q25
B AMP
(1/3) R 7
(1/3) G 8
(1/3) B 9
(1/3) Y-BIFF Y 10
(1/3) R-Y 11
(1/3) B-Y 12
TP103
TP104
TP105
Q355 2SA812 BUFF
Q357 2SA812 BUFF
Q359 2SA812 BUFF
Q356 2SC3326 SW
Q358 2SC3326 SW
Q360 2SC3326 SW
Q344 2SC1623 BUFF
Q345 2SC1623 BUFF
Q346 2SC1623 BUFF
IC5 MC14053BF
IC6 MC14053BF
IC307 MC14053BF
IC306 MC14053BF
IC305 MC14053BF
IC305 - 307
INPUT SELECTOR
TO VA-26 BOARD (1/3)
R LEVEL
G LEVEL
B LEVEL
0.65Vp-p(H)
0.65Vp-p(H)
0.65Vp-p(H)
Q326-334
Q335,338-340
R.G.B DECODER
B OFFSET
IC2 (1/2) TL082CPS
B DC AMP
IC502 (2/4) SN74HC00NS-T1
IC502 (1/4) SN74HC00NS-T1
IC501 (4/4) SN74HC00NS-T1
IC501 (1/4) SN74HC00NS-T1
IC501 (2/4) SN74HC00NS-T1
IC501 (3/4) SN74HC00NS-T1
(1/3) RGB Y 13
(1/3) VBS 14
(1/3) Y-BIFF 15
0.7Vp-p(H)
0.7Vp-p(H)
0.7Vp-p(H)
9V-2
IC309 RC78L05
IN OUT GND
COLOR GAIN
Y LEVEL
Q345 2SC1623 BUFF
Q346 2SC1623 BUFF
Q318 2SC3326A SW
Q319 2SC3326A SW
Q320 2SC3326A SW
Q321 2SA812 BUFF
Q322 2SA812 BUFF
Q347 2SC1623
B-Y LEVEL
R-Y LEVEL
B-Y
R-Y
TP323
TP324
TP325
0.12Vp-p(H)
(1/3) C 16
(1/3) Y 17
0.25Vp-p(H)
IC303 (1/2) TL082CPS
IC315 CXA1228S
ENCODER
⑪ 0.12Vp-p(H)
⑫ 2mVp-p(H)
3.58MHz
Q348 2SC1623 BUFF
Q368 DTC144ES
Q369 DTC144ES
DEC BF
ACK
ACK DET.
IC304 (1/2) TL082CPS
D301 1SS123
HUE
APC FREE RUN
RV312 500
IC303 (2/2) TL082CPS
IC303
TL082CPS
HUE CONT
(1/3) B/W H 20
(2/3) ACK 21
(2/3) BCC LALT 22
IC502 (4/4) SN74HC00NS-T1
NAND GATE
TO VA-26 BOARD (2/3)
IC304 (2/2) TL082CPS
IC3 (2/2) TL082CPS
IC502 (3/4) SN74HC00NS-T1
S301
ADJ
NORM

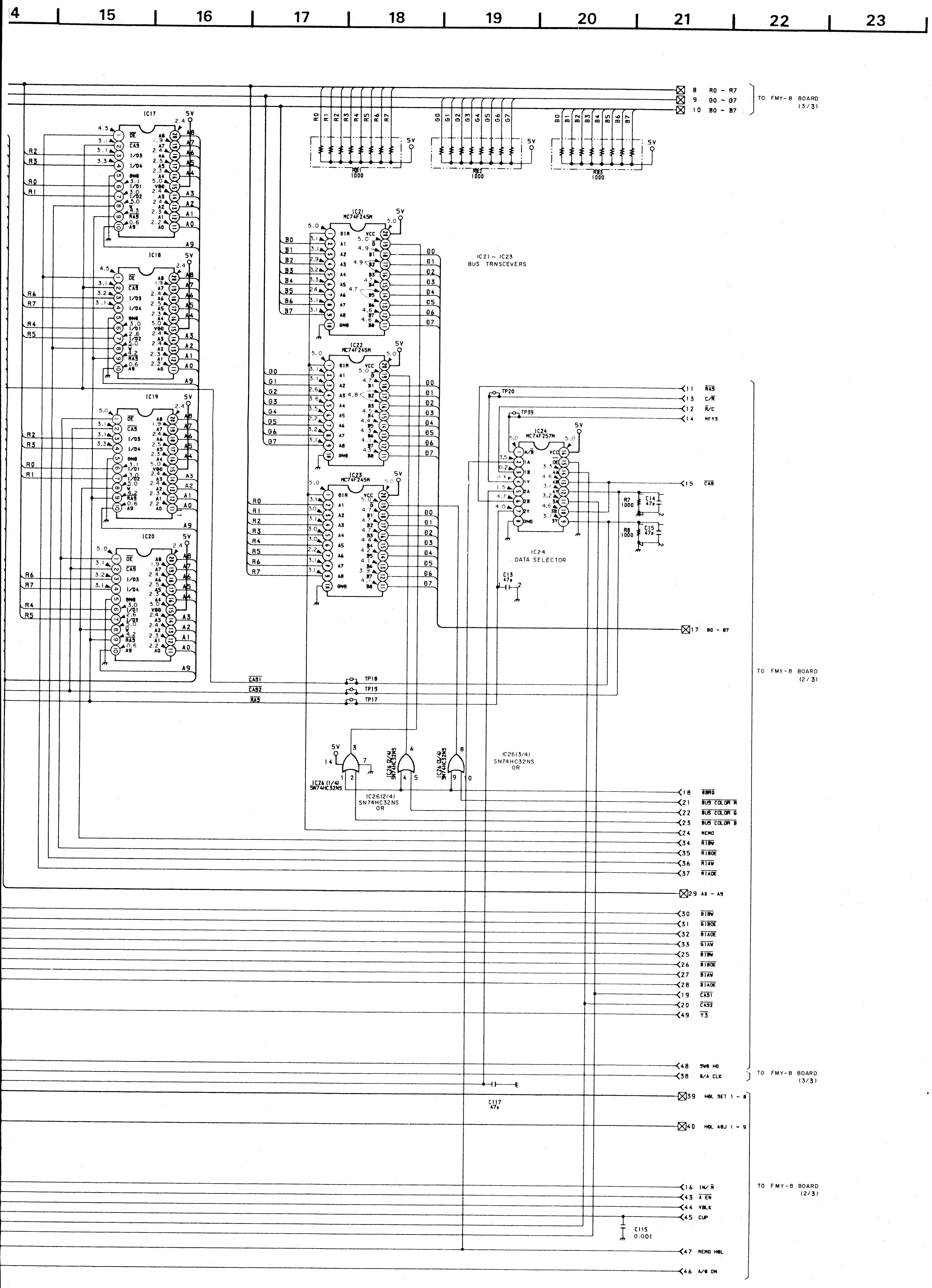

9
10
11
12
13
14
15
16
17
18
19
Q1-Q3
R AMP
R.G.B AMP
MIX
R.G.B OUTPUT AMP
Q12-Q14
G AMP
Q23-Q25
B AMP
A/D IN R GAIN
A/D IN G GAIN
A/D IN B GAIN
0.65Vp-p(H)
B OFFSET
G OFFSET
R OFFSET
B DC AMP
G DC AM
R DC AMP
Q5,16,40
SW
B BLK LEVEL
R BLK LEVEL
G BLK LEVEL
IC7
MC14053BF
BLK SW
INV
Q35-38
GAIN CONT
IC702
RC4560M
GAIN CONT
IC701
RC4560M
GAIN CONT
AGC RANGE
AGC LEVEL
REF
GAIN LEVEL
0.7Vp-p(H)
SW
Q323-325
Y DELAY
BUFF
R-Y LEVEL
3.58MHz
+9V REG
IC503 RC7809FA
IC504 RC7909FA
-5V REG
IC505 RC7905FA
IC504
-9V REG
+9V REG
IC506 RC7809FA
-9V REG
IC507 RC7909FA
-5V REG
IC508 RC7905FA
CN503
+12V
+12V
GND
GND
-12V
+5V
+5V
GND
GND
TO PS BOARD
CN4


17
18
19
20
21
22
23
24
R.G.B OUTPUT AMP
1.8Vp-p(H)
1.8Vp-p(H)
1.8Vp-p(H)
CN1 8P
R
GND
G
GND
B
GND
REF
GND
TO FMY-8 BOARD W1
A/D IN R GAIN
A/D IN G GAIN
A/D IN B GAIN
2SA1226-T1E3E
2SC2714Y-TE85L
2SA812-T1M6
INV
1SS123
1S2837
TO VA-26 BOARD(1/3)
CLAMP
VH BLK
IC702
RC4560M
GAIN CONT
2SC1623-T1L4
CN5 8P
+9V
COLOR
GND
HUE
GAIN
SELECT
ABC
VAR
TO DSC-8 BOARD CN1101
GAIN LEVEL
REF
CN501 8P
SIGNAL 1
SIGNAL 2
NC
SRS/THRU
RGB/Y-DIFF
SIG DET
HT/NORM
GND
TO SY-9 BOARD CN3
TO VA-26 BOARD(2/3)
TO VA-26 BOARD(1/3)
CN502 3P
TO IF-19 BOARD CN801
DEC SC
SIGNAL 2
SIGNAL 1
TO VA-26 BOARD(2/3)
CN503 9P
+12V
+12V
GND
GND
-12V
+5V
+5V
GND
GND
TO PS BOARD CN4
CN504 4P
+9V
+5V
GND
-5V
TO IF-19 BOARD CN802
9V-2
5V
5V-2
-9V
9V

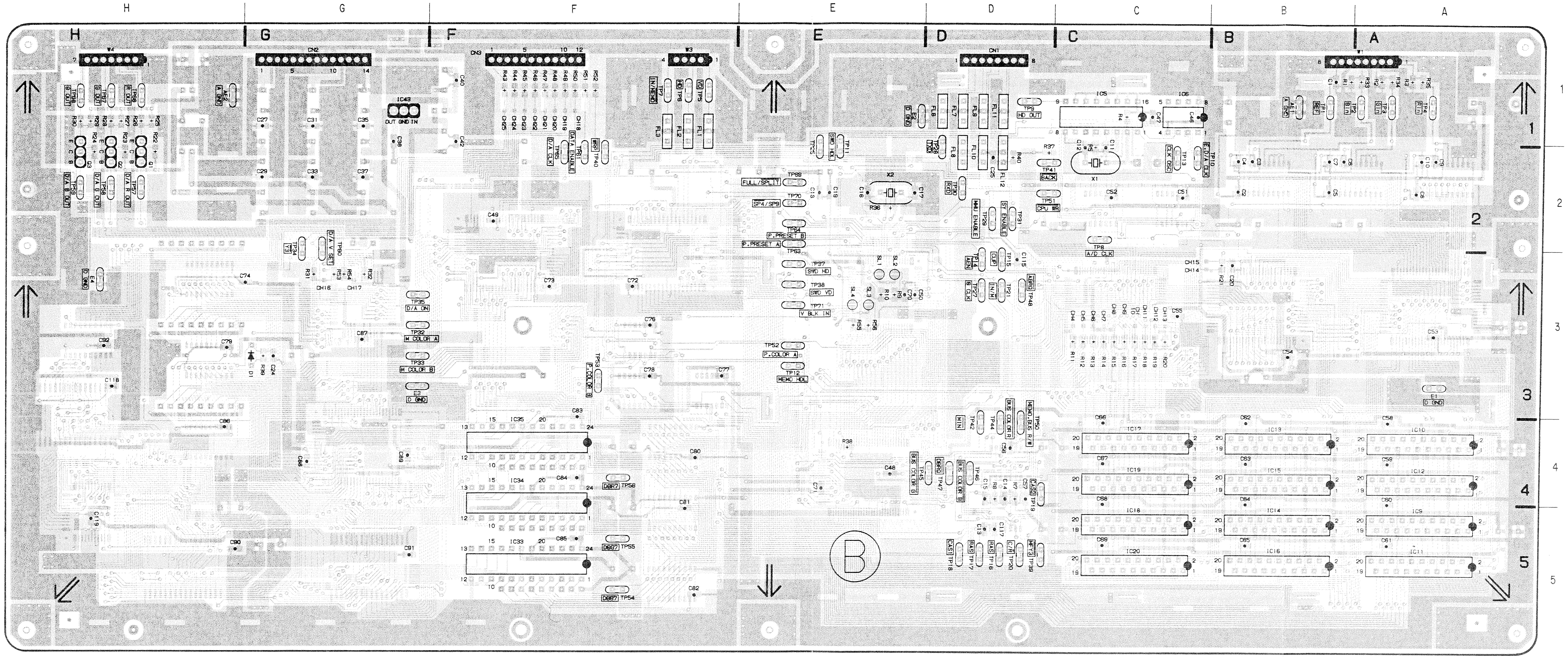

IC1 CXD1175AM
IC1 - IC3 CXD1175AM A/D CONVERTER
TO VA-26 BOARD CN1
IC2 CXD1175AM
IC3 CXD1175AM
IC7 μPD65015GF-052 DRAM CONTROLLER
IC8 (2/4) SN74HC32NS OR
IC27 (1/6) SN74HC04NS INVERTER
TO FMY-8 BOARD (2/3)
TO VA-26 BOARD CN1002
FULL/SPRIT
SP4/SP9
SWD VD
V BLK IN
IN/MEMO
H.BLK
0.8Vp-p
0.4Vp-p
IC4 GATE ARRAY
IC4 μPD65006GF
2.4Vp-p 14.3MHz
IC5 CXD1332P HD GENERATOR
X1 14.318MHz
IC6 BS1000N-75
IC25 (1/4) SN74HC86NS
IC25 (2/4) SN74HC86NS
IC25 (3/4) SN74HC86NS
IC25 (4/4) SN74HC86NS
LPF
FL1
FL2
FL3
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
1
2
3
4
5
6
7
8
9

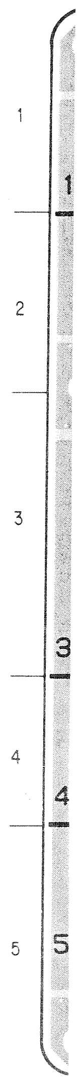
7
8
9
10
11
12
13
14
15
16
17
18
IC9 - IC20
HM51H256AZP-8(UP-5100 ONLY)
HM51H240AZP-8(UP-5150 ONLY)
DRAM
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC20
IC7
μPD65015OF-052
DRAM
CONTROLLER
IC8 (2/4)
SN74HC32NS
OR
IC27 (1/6)
SN74HC04NS
INVERTER
IC4
GATE ARRAY
RB1
1000
IC21
MC74F245M
IC22
MC74F245M
IC23
MC74F245M
IC26 (1/4)
SN74HC32NS
IC26 (2/4)
SN74HC32NS
OR
IC25 (1/4)
SN74HC86NS
IC25 (2/4)
SN74HC86NS
IC25 (3/4)
SN74HC86NS
IC25 (4/4)
SN74HC86NS
IC6
851000M-75
IC8 (1/4)
SN74HC32NS
IC8 (3/4)
SN74HC32NS
IC8 (4/4)
SN74HC32NS
IC26 (4/4)
SN74HC32NS
CAS1
CAS2
RAS
TP18
TP19
TP17
TP37
TP65
TP16
TP21
TP14
TP15
TP10
TP25
TP8
TP9
5V

MEM
FM


4
15
16
17
18
19
20
21
22
23
8 R0 ~ R7
9 G0 ~ G7
10 B0 ~ B7
TO FMY-8 BOARD (3/3)
RB1 1000
RB2 1000
RB3 1000
IC17
IC18
IC19
IC20
IC21 MC74F245M
IC22 MC74F245M
IC23 MC74F245M
IC21 – IC23 BUS TRNSCEVERS
IC24 MC74F257M
IC24 DATA SELECTOR
TP20
TP39
11 RAS
13 C/R
12 R/C
14 MFY3
15 CAS
R7 1000
C14 47p
R8 1000
C15 47p
C13 47p
17 B0 ~ B7
TO FMY-8 BOARD (2/3)
CAS1
CAS2
RAS
TP18
TP19
TP17
IC26 (1/4) SN74HC32NS
IC26(2/4) SN74HC32NS OR
IC26(3/4) SN74HC32NS OR
18 BBRQ
21 BUS COLOR R
22 BUS COLOR G
23 BUS COLOR B
24 MEMO
34 R1BW
35 R1BOE
36 R1AW
37 R1AOE
29 A0 ~ A9
30 G1BW
31 G1BOE
32 G1AOE
33 G1AW
25 B1BW
26 B1BOE
27 B1AW
28 B1AOE
19 CAS1
20 CAS2
49 Y3
48 SWB HD
38 B/A CLK
TO FMY-8 BOARD (3/3)
C117 47p
39 HBL SET 1 ~ 8
40 HBL ADJ 1 ~ 9
16 IN/M
43 A EN
44 VBLK
45 CUP
C115 0.001
47 MEMO HBL
46 A/B ON
TO FMY-8 BOARD (2/3)

FMY-8 (FRAME MEMORY)

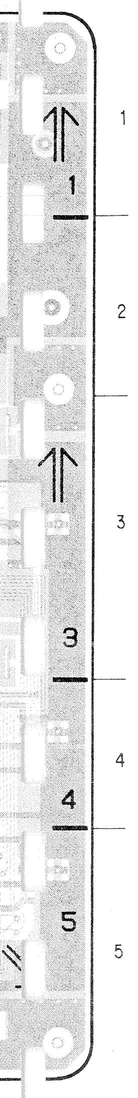




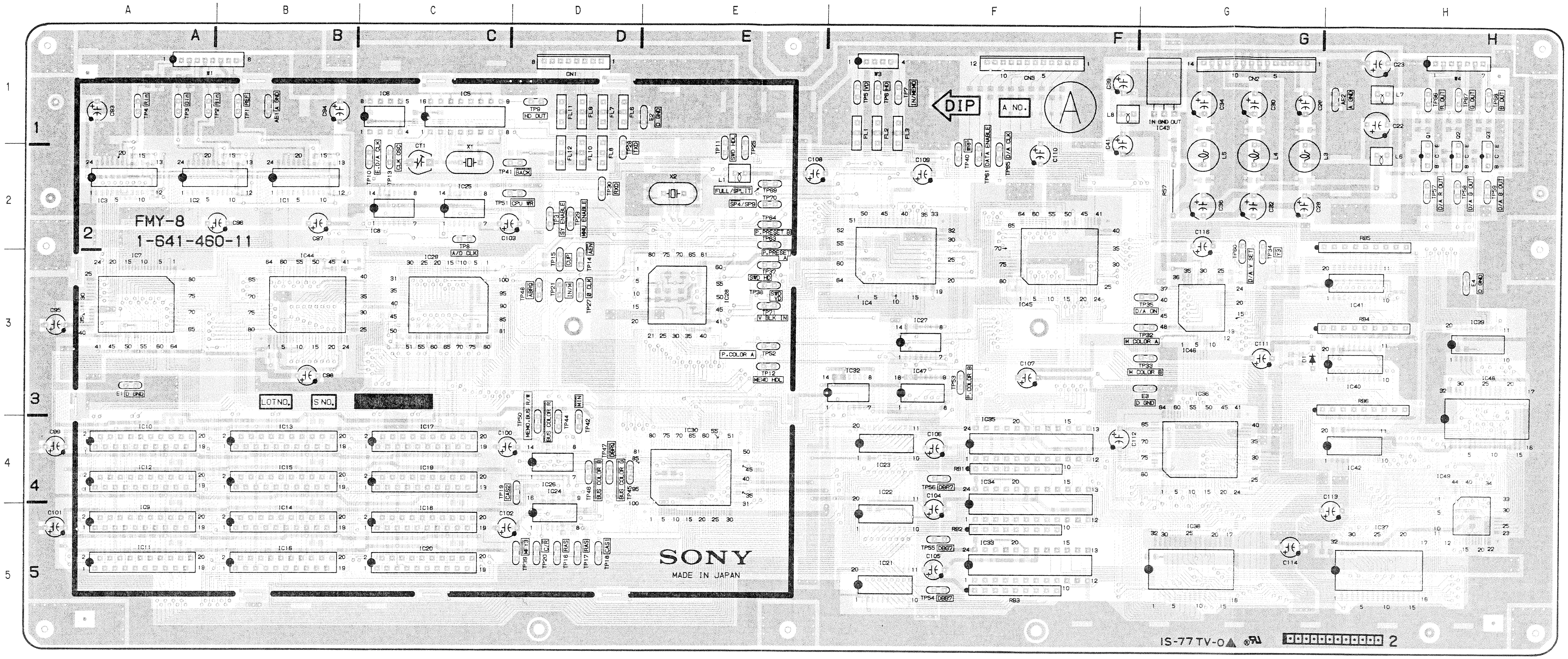
FMY-8 –SOLDERING SIDE–
1-641-460-11

FMY-8 Board

CN1	D-1
CN2	G-1
CN3	F-1
CT1	C-2
E1	A-3
E2	E-1
E3	G-3
E4	H-3
IC1	B-2
IC2	A-2
IC3	A-2
IC4	F-3
IC5	C-1
IC6	C-1
IC7	A-3
IC8	C-2
IC21	F-5
IC22	F-4
IC23	F-4
IC24	D-4
IC25	C-2
IC26	D-4
IC27	F-3
IC28	E-3
IC29	C-3
IC30	E-4
IC32	F-3
IC33	F-5
IC34	F-4
IC35	F-4
IC36	G-3
IC37	H-5
IC38	G-5
IC39	H-3
IC40	H-3
IC41	H-3
IC42	H-4
IC43	G-1
IC44	B-3
IC45	F-3
IC46	G-3
IC47	F-3
IC48	H-3
IC49	H-4
L1	E-2
L3	G-2
L4	G-2
L5	G-5
L6	H-2
L7	H-1
L8	F-1
Q1	H-2
Q2	H-2
Q3	H-2
RB1	F-4
RB2	F-5
RB3	F-5
RB4	H-3
RB5	H-2
RB6	H-3
TP1	B-1
TP2	B-1
TP3	A-1
TP4	A-1
TP5	F-1
TP6	F-1
TP7	F-1
TP8	C-2
TP9	D-1
TP10	C-2
TP11	E-2
TP12	E-3
TP13	C-2
TP14	D-3
TP15	D-3
TP16	D-5
TP17	D-5
TP18	D-5
TP19	C-4
TP20	D-5
TP21	D-3
TP25	D-3
TP27	D-3
TP28	D-2
TP29	D-2
TP30	D-2
TP31	D-2
TP32	G-3
TP33	G-3
TP34	G-1
TP35	G-3
TP37	E-3
TP38	E-3
TP39	D-5
TP40	F-2
TP41	C-2
TP42	D-4
TP44	D-4
TP45	D-4
TP46	D-4
TP47	D-4
TP48	D-3
TP50	D-4
TP51	C-2
TP52	E-3
TP53	F-3
TP54	F-5
TP55	F-5
TP56	F-4
TP57	H-2
TP58	H-2
TP59	H-2
TP60	G-1
TP61	F-2
TP63	E-2
TP64	E-2
TP65	F-2
TP66	H-1
TP67	H-1
TP68	H-1
TP69	E-2
TP70	E-2
TP71	E-3
W1	A-1
W3	F-1
W4	H-1
X1	C-2
X2	E-2



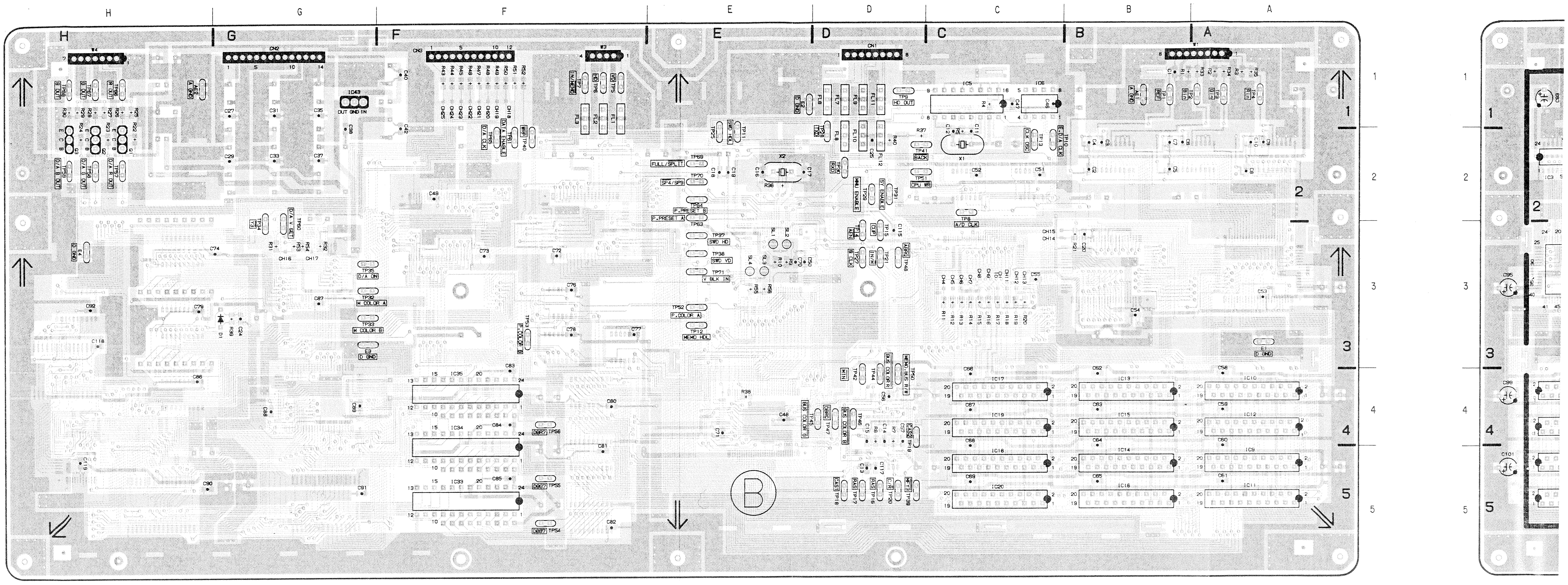
LDERING SIDE–


A
B
C
D
E
F
G
H
1
2
3
4
5
FMY-8
1-641-460-11
SONY
MADE IN JAPAN
DIP
A NO.
A
LOT NO.
S NO.
CN1
CN2
CN3
IS-77 TV-0

FMY-8 –COMPONENT SIDE–
1-641-460-11

● : Conductor side pattern
● : Component side pattern

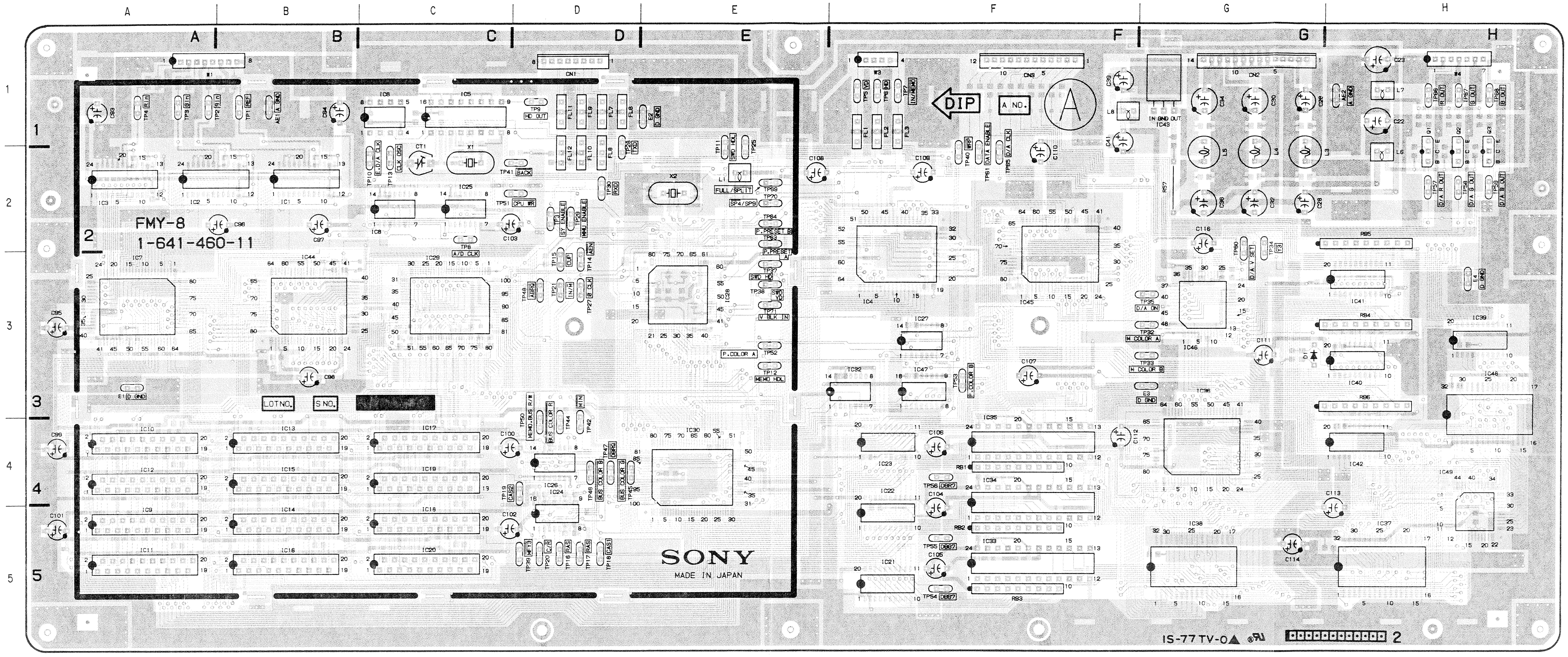
MY-8 (FRAME MEMORY)


H
G
F
E
D
C
B
A
1
2
3
4
5
CN1
CN2
CN3
IC5
IC6
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC19
IC20
IC33
IC34
IC35
IC43
X1
X2
W1
W3
W4

FMY-8 –SOLDERING SIDE–
1-641-460-11

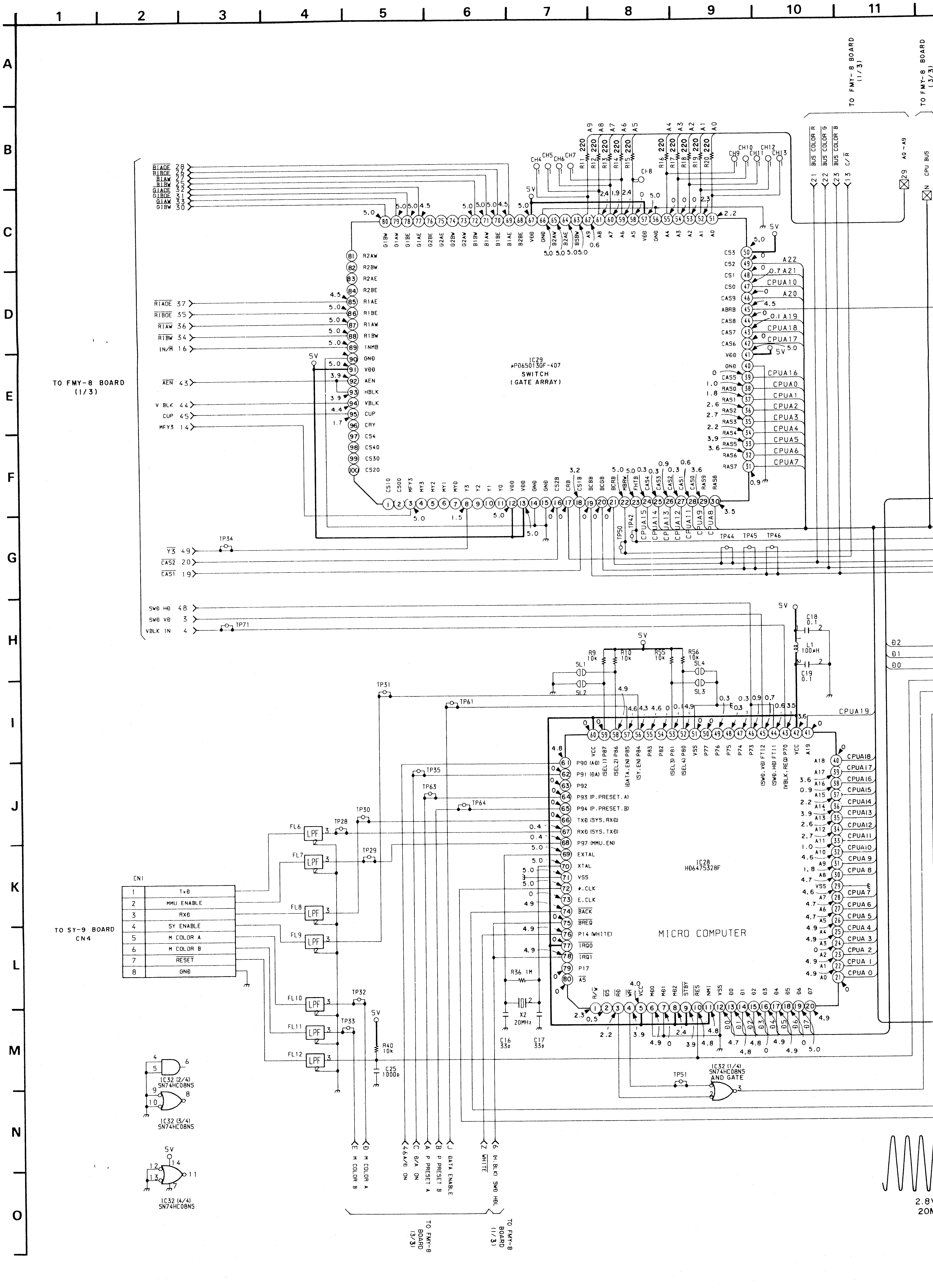
FMY-8 Board

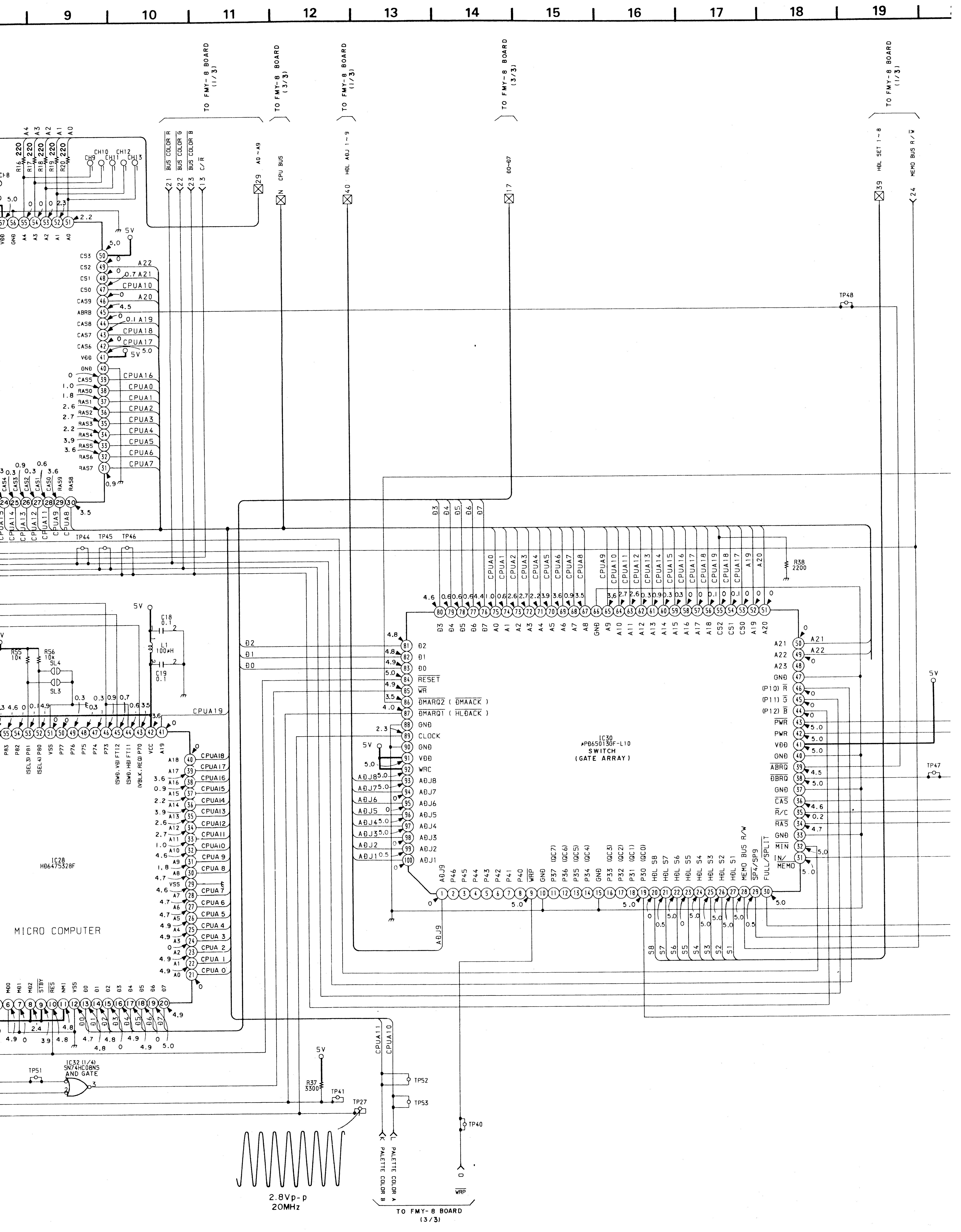
N1	D-1
N2	G-1
CN3	F-1
T1	C-2
1	A-3
E2	E-1
E3	G-3
4	H-3
C1	B-2
IC2	A-2
IC3	A-2
C4	F-3
C5	C-1
C6	C-1
IC7	A-3
IC8	C-2
IC21	F-5
IC22	F-4
IC23	F-4
IC24	D-4
IC25	C-2
IC26	D-4
IC27	F-3
IC28	E-3
IC29	C-3
IC30	E-4
IC32	F-3
IC33	F-5
IC34	F-4
IC35	F-4
IC36	G-3
IC37	H-5
IC38	G-5
IC39	H-3
IC40	H-3
IC41	H-3
IC42	H-4
IC43	G-1
IC44	B-3
IC45	F-3
IC46	G-3
IC47	F-3
IC48	H-3
IC49	H-4
L1	E-2
L3	G-2
L4	G-2
L5	G-5
L6	H-2
L7	H-1
L8	F-1
Q1	H-2
Q2	H-2
Q3	H-2
RB1	F-4
RB2	F-5
RB3	F-5
RB4	H-3
RB5	H-2
RB6	H-3
TP1	B-1
TP2	B-1
TP3	A-1
TP4	A-1
TP5	F-1
TP6	F-1
TP7	F-1
TP8	C-2
TP9	D-1
TP10	C-2
TP11	E-2
TP12	E-3
TP13	C-2
TP14	D-3
TP15	D-3
TP16	D-5
TP17	D-5
TP18	D-5
TP19	C-4
TP20	D-5
TP21	D-3
TP25	D-3
TP27	D-3
TP28	D-2
TP29	D-2
TP30	D-2
TP31	D-2
TP32	G-3
TP33	G-3
TP34	G-1
TP35	G-3
TP37	E-3
TP38	E-3
TP39	D-5
TP40	F-2
TP41	C-2
TP42	D-4
TP44	D-4
TP45	D-4
TP46	D-4
TP47	D-4
TP48	D-3
TP50	D-4
TP51	C-2
TP52	E-3
TP53	F-3
TP54	F-5
TP55	F-5
TP56	F-4
TP57	H-2
TP58	H-2
TP59	H-2
TP60	G-1
TP61	F-2
TP63	E-2
TP64	E-2
TP65	F-2
TP66	H-1
TP67	H-1
TP68	H-1
TP69	E-2
TP70	E-2
TP71	E-3
W1	A-1
W3	F-1
W4	H-1
X1	C-2
X2	E-2

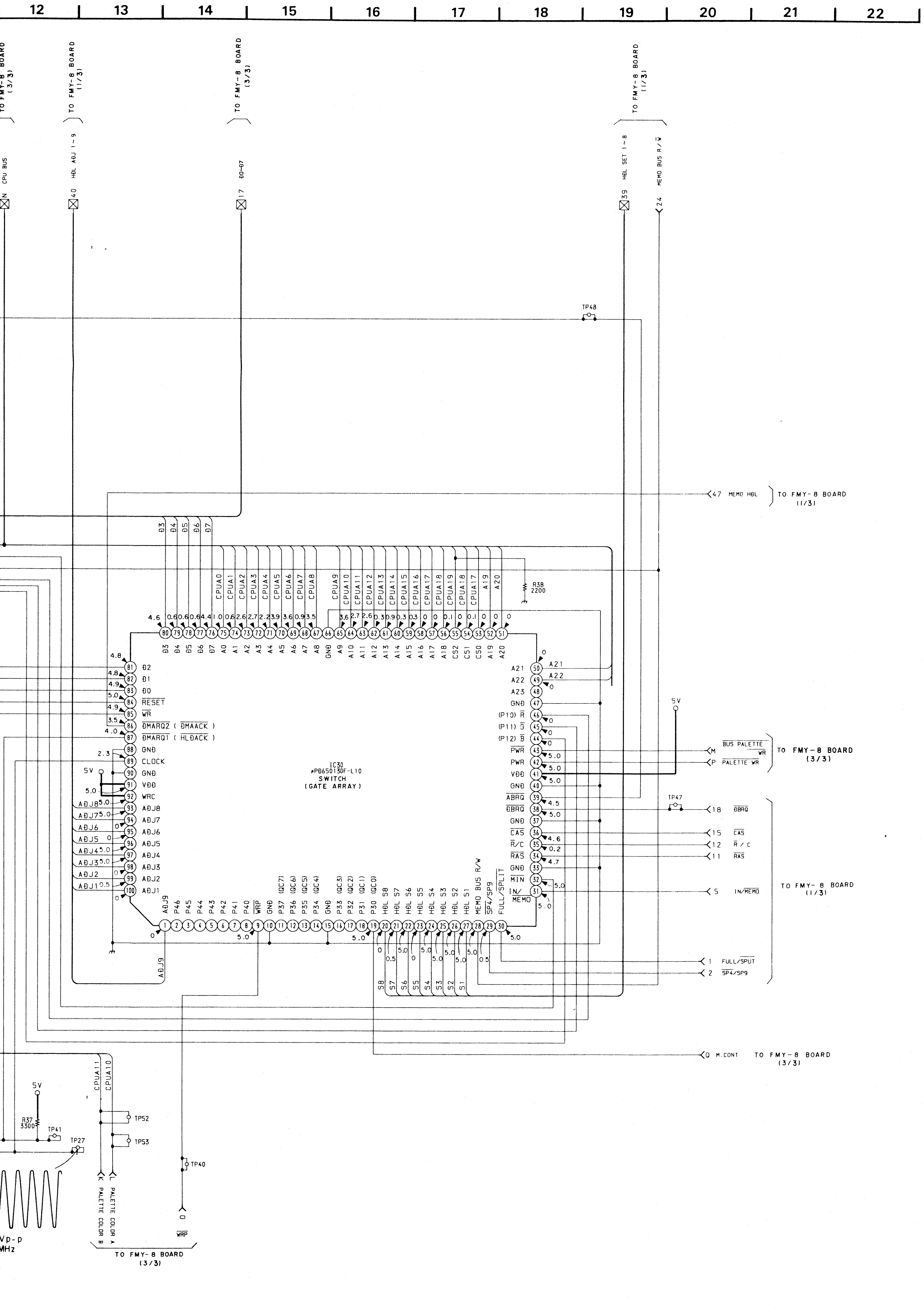

A
B
C
D
E
F
G
H
1
2
3
4
5
FMY-8
1-641-460-11
SONY
MADE IN JAPAN
DIP
A NO.
LOT NO.
S NO.
IS-77 TV-0
2

FMY-8 –COMPONENT SIDE–
1-641-460-11

▨ : Conductor side pattern
▨ : Component side pattern

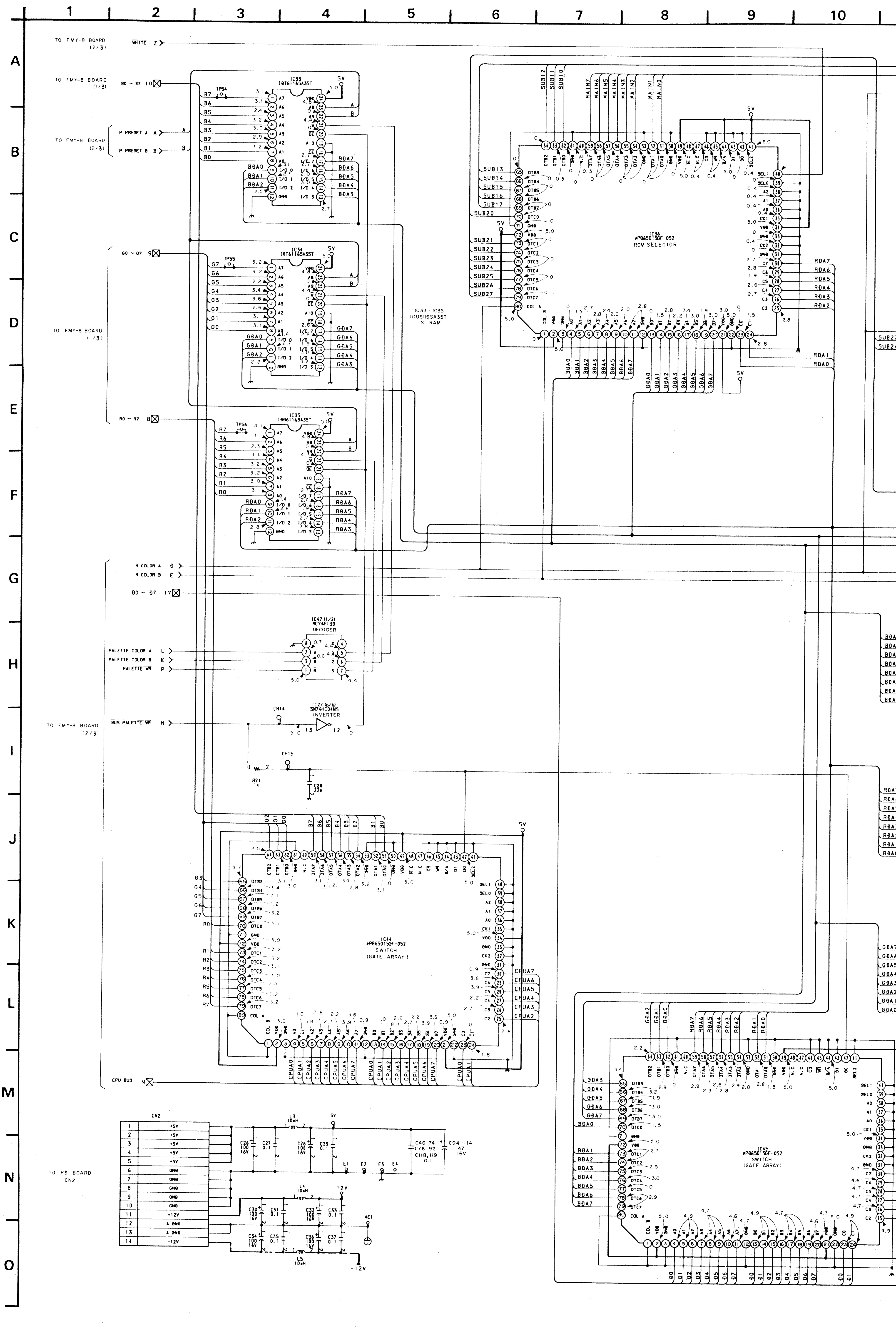

1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
TO FMY-8 BOARD (1/3)
TO FMY-8 BOARD (3/3)
BUS COLOR R
BUS COLOR G
BUS COLOR B
C/R̄
A0 ~ A9
CPU BUS
B1ADE 28
B1BOE 29
B1AW 27
B1BW 25
G1ADE 32
G1BOE 31
G1AW 33
G1BW 30
R1ADE 37
R1BOE 35
R1AW 36
R1BW 34
IN/H̄ 16
AEN 43
V BLK 44
CUP 45
MFY3 14
TO FMY-8 BOARD (1/3)
Y3 49
CAS2 20
CAS1 19
SWD HD 48
SWD VD 3
VBLK IN 4
TP34
TP71
IC29
μPD65013GF-407
SWITCH
(GATE ARRAY)
R11 220
R12 220
R13 220
R14 220
R15 220
R16 220
R17 220
R18 220
R19 220
R20 220
CH4
CH5
CH6
CH7
CH8
CH9
CH10
CH11
CH12
CH13
A22
A21
CPUA10
A20
A19
CPUA18
CPUA17
CPUA16
CPUA0
CPUA1
CPUA2
CPUA3
CPUA4
CPUA5
CPUA6
CPUA7
CPUA15
CPUA14
CPUA13
CPUA12
CPUA11
CPUA9
CPUA8
TP42
TP44
TP45
TP46
TP50
5V
C18 0.1
L1 100μH
C19 0.1
R9 10k
R10 10k
R55 10k
R56 10k
SL1
SL2
SL3
SL4
CPUA19
TP31
TP61
TP35
TP63
TP64
TP30
TP28
TP29
FL6
FL7
FL8
FL9
FL10
FL11
FL12
LPF
TP32
TP33
R40 10k
C25 1000p
IC28
HD6475328F
MICRO COMPUTER
P90 (AD)
P91 (DA)
P92
P93 (P.PRESET.A)
P94 (P.PRESET.B)
TXD (SYS.RXD)
RXD (SYS.TXD)
P97 (MMU.EN)
EXTAL
XTAL
VSS
φ.CLK
E.CLK
BACK
BREQ
P14 (WHITE)
IRQ0
IRQ1
P17
AS
R36 1M
X2 20MHz
C16 33p
C17 33p
CN1
TO SY-9 BOARD CN4
1 TxD
2 MMU ENABLE
3 RXD
4 SY ENABLE
5 M COLOR A
6 M COLOR B
7 RESET
8 GND
IC32 (1/4) SN74HC08NS AND GATE
TP51
IC32 (2/4) SN74HC08NS
IC32 (3/4) SN74HC08NS
IC32 (4/4) SN74HC08NS
E M COLOR B
D M COLOR A
4 A/D ON
C D/A ON
A P PRESET A
B P PRESET B
J DATA ENABLE
Z WHITE
6 (H.BLK) SWD HDL
TO FMY-8 BOARD (3/3)
TO FMY-8 BOARD (1/3)
2.8V
20M

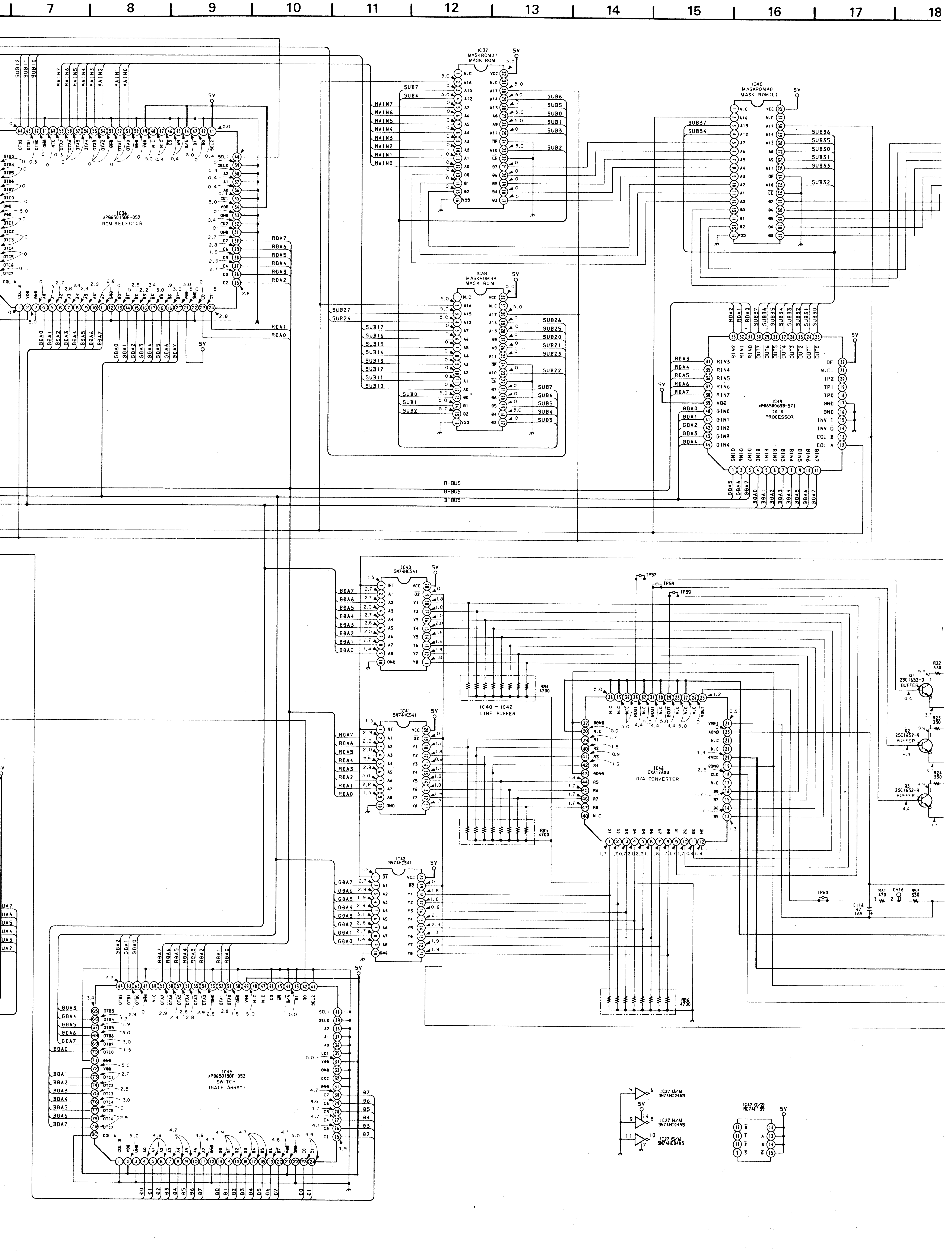

9
10
11
12
13
14
15
16
17
18
19
TO FMY-8 BOARD (1/3)
TO FMY-8 BOARD (3/3)
BUS COLOR R
BUS COLOR G
BUS COLOR B
C/R
A0~A9
CPU BUS
HDL ADJ 1~9
D0~D7
HDL SET 1~8
MEMO BUS R/W
CH9
CH10
CH11
CH12
CH13
R16 220
R17 220
R18 220
R19 220
R20 220
TP44
TP45
TP46
TP47
TP48
TP40
TP41
TP27
TP51
TP52
TP53
C18 0.1
C19 0.1
L1 100µH
R55 10k
R56 10k
SL4
SL3
R37 3300
R38 2200
5V
IC28
HD6475328F
MICRO COMPUTER
IC30
µPD65013GF-L10
SWITCH
(GATE ARRAY)
IC32 (1/4)
SN74HC08NS
AND GATE
CPUA0
CPUA1
CPUA2
CPUA3
CPUA4
CPUA5
CPUA6
CPUA7
CPUA8
CPUA9
CPUA10
CPUA11
CPUA12
CPUA13
CPUA14
CPUA15
CPUA16
CPUA17
CPUA18
CPUA19
A19
A20
A21
A22
A23
D0
D1
D2
D3
D4
D5
D6
D7
RESET
WR
DMARQ2 (DMAACK)
DMARQ1 (HLDACK)
GND
CLOCK
VDD
WRC
ADJ1
ADJ2
ADJ3
ADJ4
ADJ5
ADJ6
ADJ7
ADJ8
ADJ9
(P10) R
(P11) G
(P12) B
PWR
ABRQ
DBRQ
CAS
R/C
RAS
MIN
IN/MEMO
FULL/SPLIT
SP4/SP9
MEMO BUS R/W
HDL S1
HDL S2
HDL S3
HDL S4
HDL S5
HDL S6
HDL S7
HDL S8
CS0
CS1
CS2
CS3
CAS0
CAS1
CAS2
CAS3
CAS4
CAS5
CAS6
CAS7
CAS8
CAS9
ABRB
RAS0
RAS1
RAS2
RAS3
RAS4
RAS5
RAS6
RAS7
RAS8
RAS9
VSS
VCC
MD0
MD1
MD2
STBY
RES
NMI
(SEL3) P81
(SEL4) P80
(SWD.VD) FT12
(SWD.HD) FT11
(VBLK.REQ) P70
PALETTE COLOR A
PALETTE COLOR B
WRP
TO FMY-8 BOARD (3/3)
2.8Vp-p
20MHz

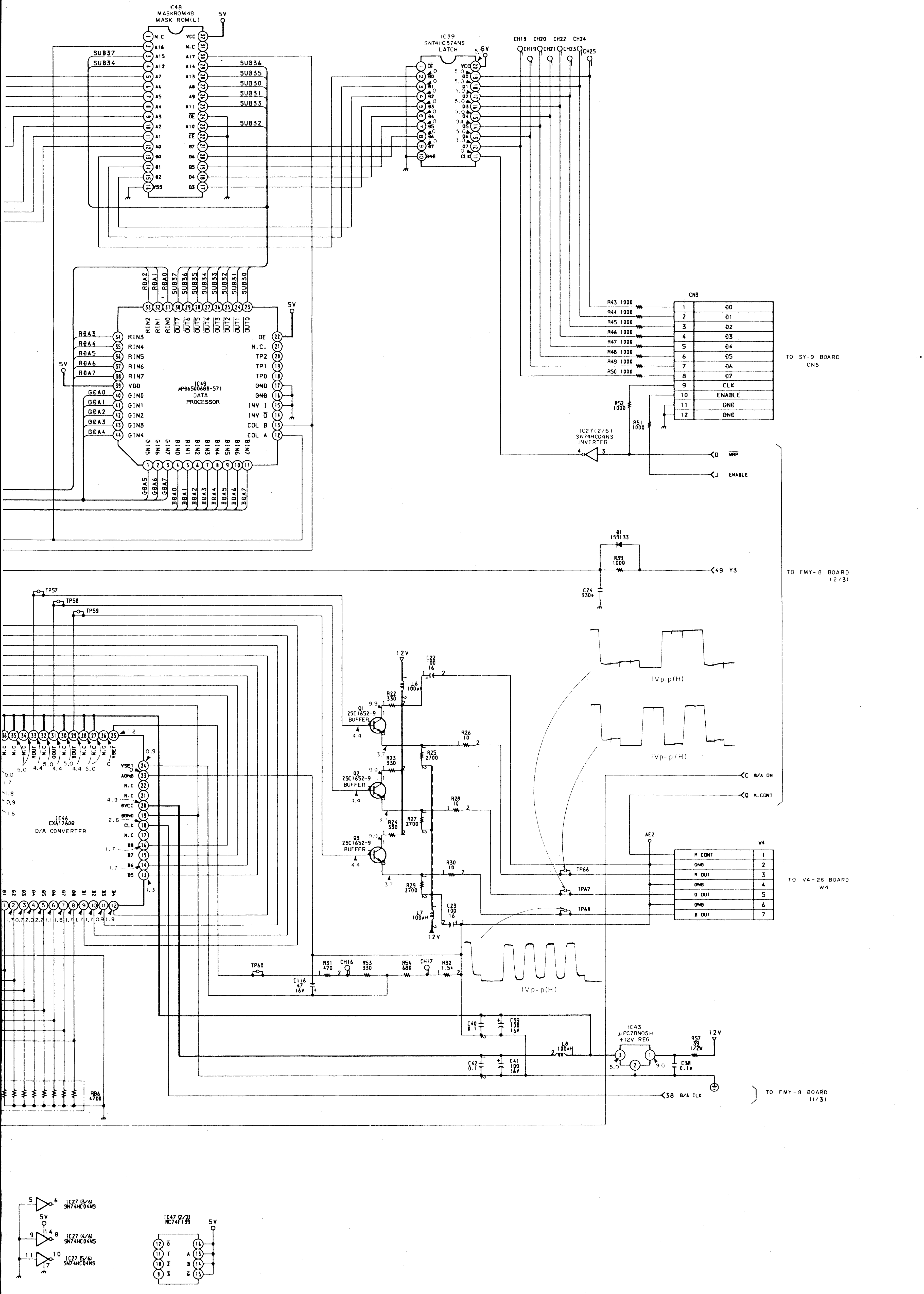


12
13
14
15
16
17
18
19
20
21
22
TO FMY-8 BOARD (3/3)
CPU BUS
TO FMY-8 BOARD (1/3)
40 HDL ADJ 1~9
TO FMY-8 BOARD (3/3)
17 D0-D7
TO FMY-8 BOARD (1/3)
39 HDL SET 1~8
24 MEMO BUS R/W
TP48
47 MEMO HDL
TO FMY-8 BOARD (1/3)
R38 2200
IC30
μPD65013GF-L10
SWITCH
(GATE ARRAY)
D3
D4
D5
D6
D7
A0
A1
A2
A3
A4
A5
A6
A7
A8
GND
A9
A10
A11
A12
A13
A14
A15
A16
A17
A18
CS2
CS1
CS0
A19
A20
CPUA0
CPUA1
CPUA2
CPUA3
CPUA4
CPUA5
CPUA6
CPUA7
CPUA8
CPUA9
CPUA10
CPUA11
CPUA12
CPUA13
CPUA14
CPUA15
CPUA16
CPUA17
CPUA18
CPUA19
CPUA18
CPUA17
A19
A20
D2
D1
D0
RESET
WR
DMARQ2 (DMAACK)
DMARQ1 (HLDACK)
GND
CLOCK
GND
VDD
WRC
ADJ8
ADJ7
ADJ6
ADJ5
ADJ4
ADJ3
ADJ2
ADJ1
5V
A21
A22
A23
GND
(P10) R
(P11) G
(P12) B
PWR
PWR
VDD
GND
ABRQ
DBRQ
GND
CAS
R/C
RAS
GND
MIN
IN/MEMO
ADJ9
P46
P45
P44
P43
P42
P41
P40
WRP
GND
P37 (QC7)
P36 (QC6)
P35 (QC5)
P34 (QC4)
GND
P33 (QC3)
P32 (QC2)
P31 (QC1)
P30 (QC0)
HDL S8
HDL S7
HDL S6
HDL S5
HDL S4
HDL S3
HDL S2
HDL S1
MEMO BUS R/W
SP4/SP9
FULL/SPLIT
5V
M BUS PALETTE WR
P PALETTE WR
TO FMY-8 BOARD (3/3)
TP47
18 DBRQ
15 CAS
12 R/C
11 RAS
5 IN/MEMO
TO FMY-8 BOARD (1/3)
1 FULL/SPLIT
2 SP4/SP9
S8
S7
S6
S5
S4
S3
S2
S1
Q M.CONT
TO FMY-8 BOARD (3/3)
CPUA11
CPUA10
TP52
TP53
5V
R37 3300
TP41
TP27
TP40
K PALETTE COLOR B
L PALETTE COLOR A
O WRP
TO FMY-8 BOARD (3/3)
Vp-p
MHz

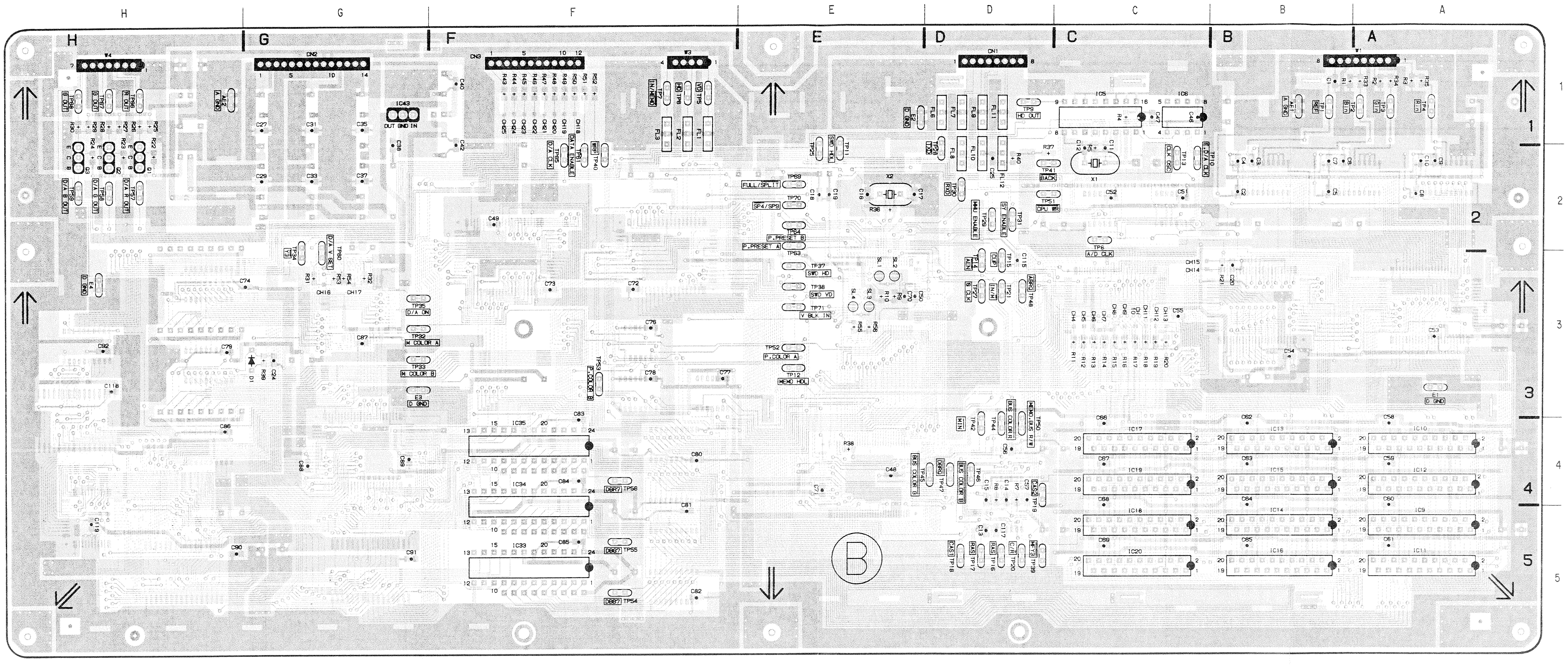
FMY-8 — 3/3 — (FRAME MEMORY)


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
TO FMY-8 BOARD (2/3)
WHITE Z
TO FMY-8 BOARD (1/3)
B0 ~ B7 10
P PRESET A A
P PRESET B B
D0 ~ D7 9
R0 ~ R7 8
IC33 IDT6116SA35T
IC34 IDT6116SA35T
IC35 IDT6116SA35T
TP54
TP55
TP56
5V
IC33 - IC35 IDT6116SA35T S RAM
IC36 μPB6501SOF-052 ROM SELECTOR
M COLOR A D
M COLOR B E
B0 ~ B7 17
IC47 (1/2) MC74F139 DECODER
PALETTE COLOR A L
PALETTE COLOR B K
PALETTE WR P
BUS PALETTE WR M
IC27 (6/6) SN74HC04NS INVERTER
CH14
CH15
R21 1k
C20 22p
IC44 μPB6501SOF-052 SWITCH (GATE ARRAY)
IC45 μPB6501SOF-052 SWITCH (GATE ARRAY)
CPU BUS N
CN2
1 +5V
2 +5V
3 +5V
4 +5V
5 +5V
6 GND
7 GND
8 GND
9 GND
10 GND
11 +12V
12 A GND
13 A GND
14 -12V
TO PS BOARD CN2
L3 10μH
L4 10μH
L5 10μH
C26 100 16V
C27 0.1
C28 100 16V
C29 0.1
C46-74 C76-92 C118, 119 0.1
C94-114 47 16V
E1
E2
E3
E4
C30 100 16V
C31 0.1
C32 100 16V
C33 0.1
C34 100 16V
C35 0.1
C36 100 16V
C37 0.1
AE1
12V
-12V

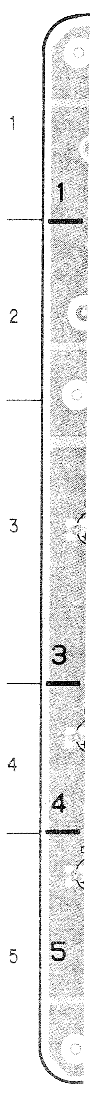

7
8
9
10
11
12
13
14
15
16
17
18
IC36
µPD65015GF-052
ROM SELECTOR
IC37
MASKROM37
MASK ROM
IC38
MASKROM38
MASK ROM
IC48
MASKROM48
MASK ROM(L)
IC49
µPD65006GB-571
DATA
PROCESSOR
R-BUS
G-BUS
B-BUS
IC40
SN74HC541
IC41
SN74HC541
IC42
SN74HC541
IC40 - IC42
LINE BUFFER
RB4
4700
RB5
4700
RB6
4700
IC46
CXA1260Q
D/A CONVERTER
IC45
µPD65015GF-052
SWITCH
(GATE ARRAY)
Q1
2SC1652-9
BUFFER
Q2
2SC1652-9
BUFFER
Q3
2SC1652-9
BUFFER
R22
330
R23
330
R24
330
R31
470
CH16
R53
330
C116
47
16V
TP57
TP58
TP59
TP60
IC27 (3/6)
SN74HC04NS
IC27 (4/6)
SN74HC04NS
IC27 (5/6)
SN74HC04NS
IC47 (2/2)
MC74F139
5V


IC48
MASKROM48
MASK ROM(L)
5V
SUB37
SUB34
SUB36
SUB35
SUB30
SUB31
SUB33
SUB32
IC39
SN74HC574NS
LATCH
CH18 CH20 CH22 CH24
CH19 CH21 CH23 CH25
RDA2 RDA1 RDA0 SUB37 SUB36 SUB35 SUB34 SUB33 SUB32 SUB31 SUB30
RDA3
RDA4
RDA5
RDA6
RDA7
GDA0
GDA1
GDA2
GDA3
GDA4
IC49
μPD6500668-571
DATA
PROCESSOR
GDA5 GDA6 GDA7 BDA0 BDA1 BDA2 BDA3 BDA4 BDA5 BDA6 BDA7
CN3
R43 1000
R44 1000
R45 1000
R46 1000
R47 1000
R48 1000
R49 1000
R50 1000
1 D0
2 D1
3 D2
4 D3
5 D4
6 D5
7 D6
8 D7
9 CLK
10 ENABLE
11 GND
12 GND
TO SY-9 BOARD
CN5
R52 1000
R51 1000
IC27(2/6)
SN74HC04NS
INVERTER
O WRP
J ENABLE
D1
1SS133
R39
1000
C24
330p
49 Y3
TO FMY-8 BOARD
(2/3)
TP57
TP58
TP59
12V
C22
100
16
L6
100μH
R22
330
Q1
2SC1652-9
BUFFER
R23
330
Q2
2SC1652-9
BUFFER
R24
330
Q3
2SC1652-9
BUFFER
R25
2700
R26
10
R27
2700
R28
10
R29
2700
R30
10
L7
100μH
C23
100
16
-12V
1Vp-p(H)
1Vp-p(H)
1Vp-p(H)
C B/A ON
Q M.CONT
AE2
W4
M CONT 1
GND 2
R OUT 3
GND 4
G OUT 5
GND 6
B OUT 7
TO VA-26 BOARD
W4
TP66
TP67
TP68
IC46
CXA1260Q
D/A CONVERTER
TP60
R31
470
CH16
R53
330
R54
680
CH17
R32
1.5k
C116
47
16V
C40
0.1
C39
100
16V
C42
0.1
C41
100
16V
L8
100μH
IC43
μPC78N05H
+12V REG
R57
39
1/2W
12V
C38
0.1μ
38 D/A CLK
TO FMY-8 BOARD
(1/3)
RB6
4700
IC27 (3/6)
SN74HC04NS
IC27 (4/6)
SN74HC04NS
IC27 (5/6)
SN74HC04NS
IC47 (2/2)
MC74F139
5V

FMY-8 (FRAME MEMORY)

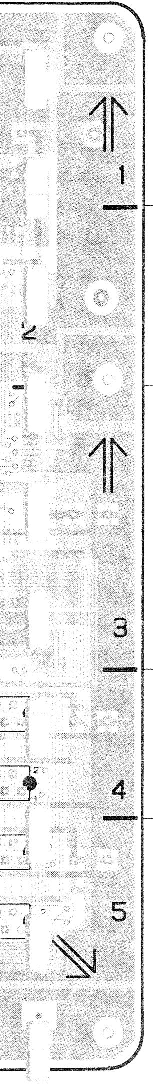

H
G
F
E
D
C
B
A
1
2
3
4
5
CN1
CN2
CN3
W1
W3
W4
IC5
IC6
IC43
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC20
IC33
IC34
IC35
X1
X2
B

FMY-8 -SOLDERING SIDE-
1-641-460-11

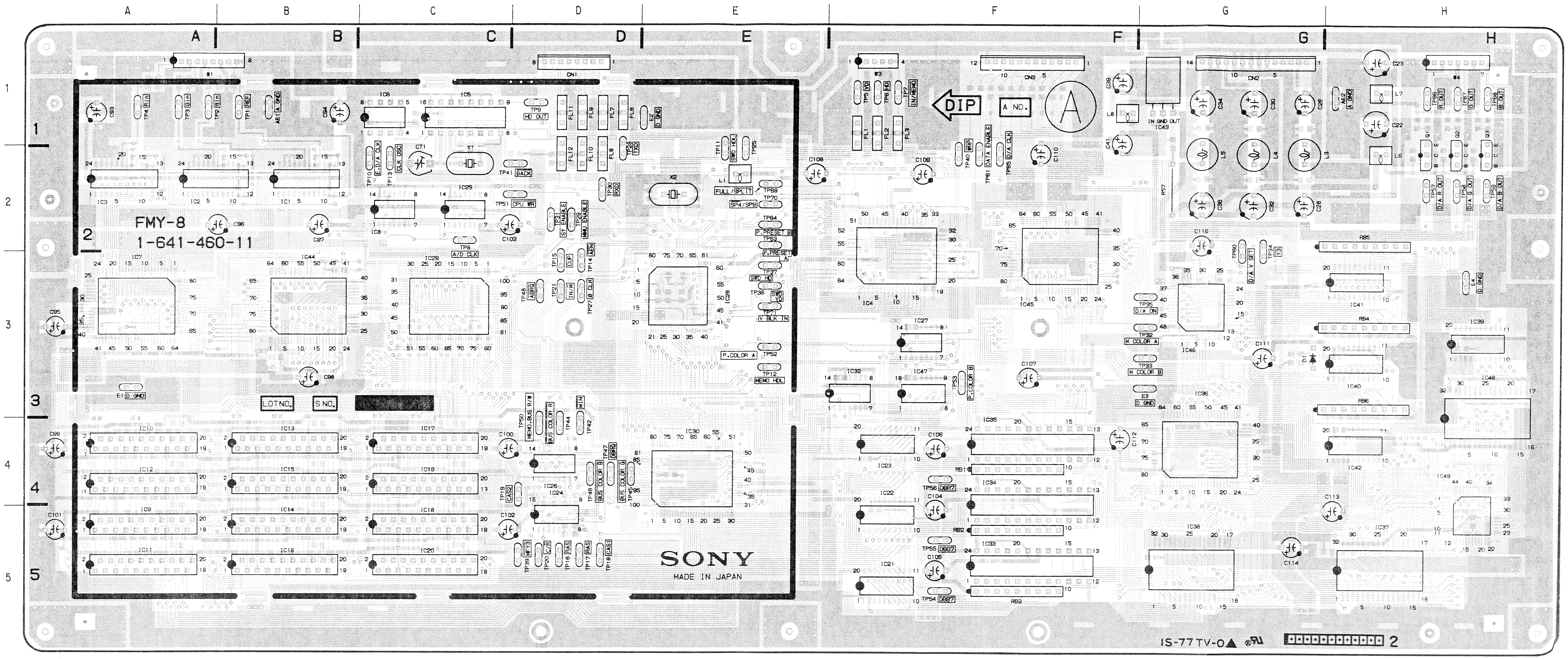


FMY-8 Board

CN1	D-1
CN2	G-1
CN3	F-1
CT1	C-2
E1	A-3
E2	E-1
E3	G-3
E4	H-3
IC1	B-2
IC2	A-2
IC3	A-2
IC4	F-3
IC5	C-1
IC6	C-1
IC7	A-3
IC8	C-2
IC21	F-5
IC22	F-4
IC23	F-4
IC24	D-4
IC25	C-2
IC26	D-4
IC27	F-3
IC28	E-3
IC29	C-3
IC30	E-4
IC32	F-3
IC33	F-5
IC34	F-4
IC35	F-4
IC36	G-3
IC37	H-5
IC38	G-5
IC39	H-3
IC40	H-3
IC41	H-3
IC42	H-4
IC43	G-1
IC44	B-3
IC45	F-3
IC46	G-3
IC47	F-3
IC48	H-3
IC49	H-4
L1	E-2
L3	G-2
L4	G-2
L5	G-5
L6	H-2
L7	H-1
L8	F-1
Q1	H-2
Q2	H-2
Q3	H-2
RB1	F-4
RB2	F-5
RB3	F-5
RB4	H-3
RB5	H-2
RB6	H-3
TP1	B-1
TP2	B-1
TP3	A-1
TP4	A-1
TP5	F-1
TP6	F-1
TP7	F-1
TP8	C-2
TP9	D-1
TP10	C-2
TP11	E-2
TP12	E-3
TP13	C-2
TP14	D-3
TP15	D-3
TP16	D-5
TP17	D-5
TP18	D-5
TP19	C-4
TP20	D-5
TP21	D-3
TP25	D-3
TP27	D-3
TP28	D-2
TP29	D-2
TP30	D-2
TP31	D-2
TP32	G-3
TP33	G-3
TP34	G-1
TP35	G-3
TP37	E-3
TP38	E-3
TP39	D-5
TP40	F-2
TP41	C-2
TP42	D-4
TP44	D-4
TP45	D-4
TP46	D-4
TP47	D-4
TP48	D-3
TP50	D-4
TP51	C-2
TP52	E-3
TP53	F-3
TP54	F-5
TP55	F-5
TP56	F-4
TP57	H-2
TP58	H-2
TP59	H-2
TP60	G-1
TP61	F-2
TP63	E-2
TP64	E-2
TP65	F-2
TP66	H-1
TP67	H-1
TP68	H-1
TP69	E-2
TP70	E-2
TP71	E-3
W1	A-1
W3	F-1
W4	H-1
X1	C-2
X2	E-2



-SOLDERING SIDE-

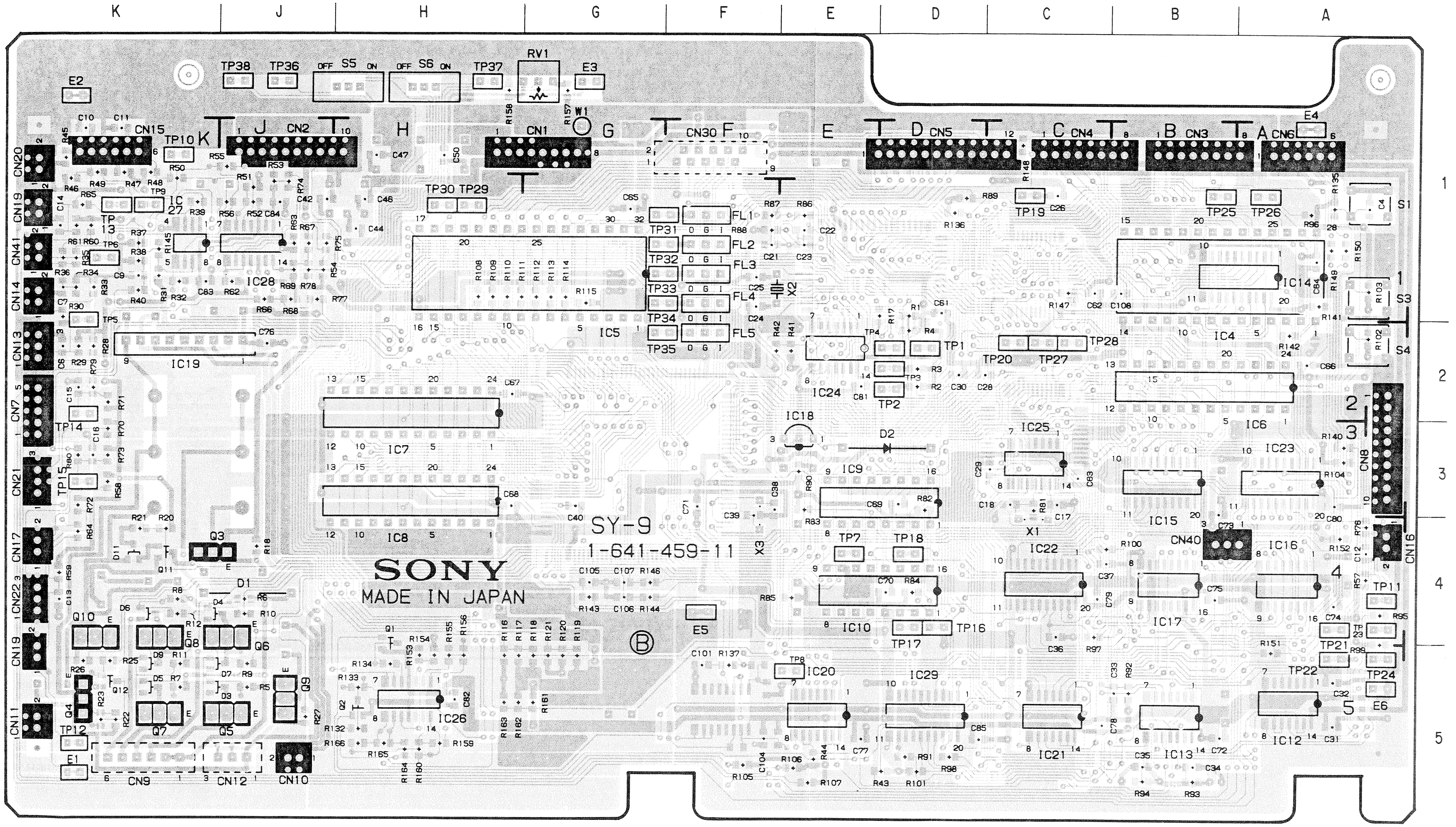

A
B
C
D
E
F
G
H
1
2
3
4
5
FMY-8
1-641-460-11
LOT NO.
S NO.
DIP
A NO.
A
SONY
MADE IN JAPAN
IS-77 TV-0
2

FMY-8 -COMPONENT SIDE-
1-641-460-11

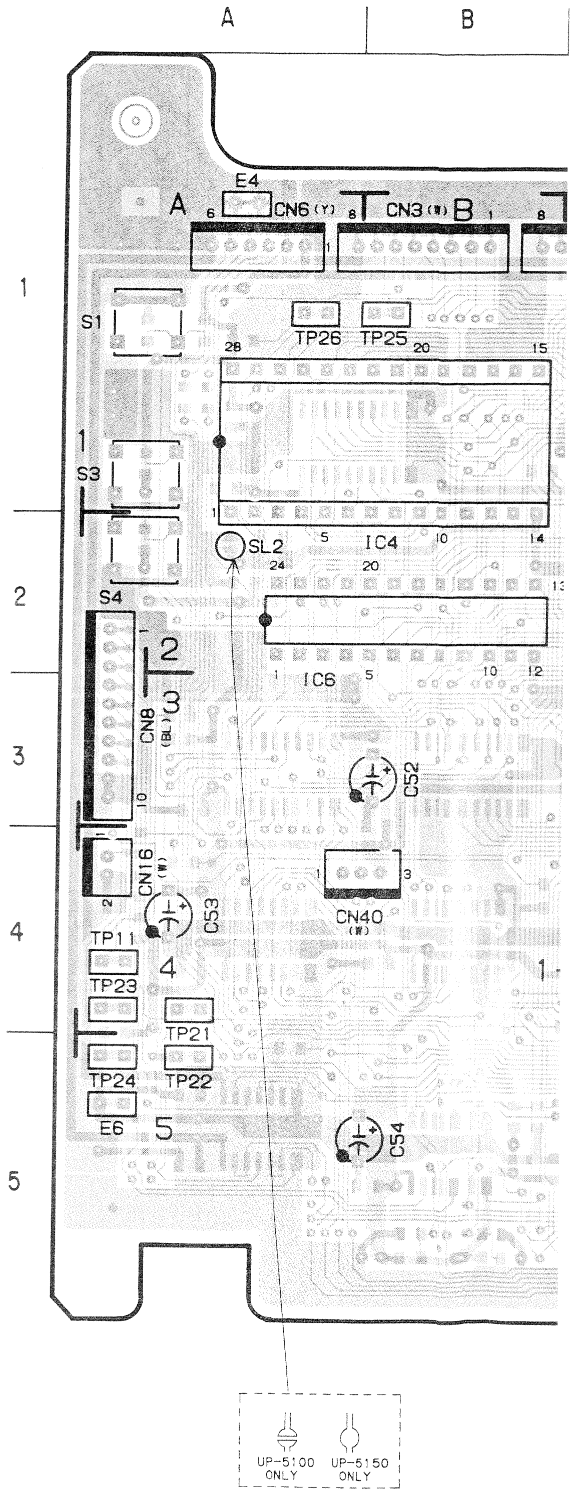
● ▨ : Conductor side pattern

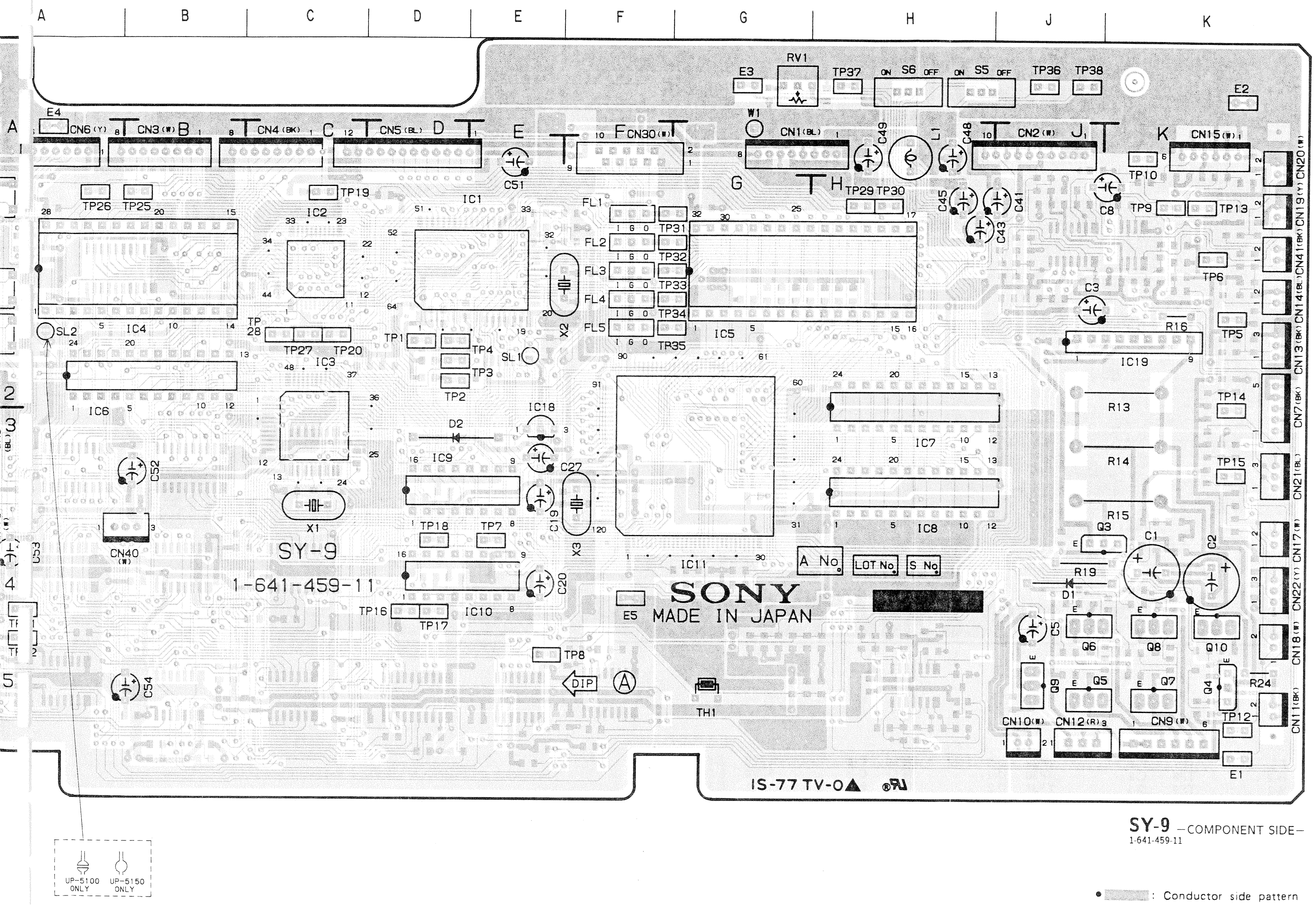
● ▨ : Component side pattern

SY-9 (SERVO/SYSTEM CONTROL)


K
J
H
G
F
E
D
C
B
A
1
2
3
4
5
CN15
CN2
CN1
CN30
CN5
CN4
CN3
CN6
CN20
CN19
CN41
CN14
CN13
CN7
CN21
CN17
CN22
CN11
CN9
CN12
CN10
CN8
CN16
CN40
S5
S6
RV1
S1
S3
S4
E2
E3
E4
E5
E6
TP38
TP36
TP37
TP10
TP30
TP29
TP31
TP32
TP33
TP34
TP35
FL1
FL2
FL3
FL4
FL5
X2
X1
X3
IC27
IC28
IC5
IC19
IC7
IC8
IC18
IC9
IC24
IC10
IC20
IC29
IC26
IC25
IC15
IC22
IC21
IC17
IC13
IC14
IC4
IC6
IC23
IC16
IC12
D1
D2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
TP1
TP2
TP3
TP4
TP7
TP17
TP18
TP16
TP19
TP20
TP27
TP28
TP25
TP26
TP11
TP21
TP22
TP23
TP24
TP12
TP14
TP15
SY-9
1-641-459-11
SONY
MADE IN JAPAN

SY-9 –SOLDERING SIDE–
1-641-459-11


A
B
1
2
3
4
5
E4
CN6 (Y)
CN3 (W)
S1
S3
S4
SL2
TP26
TP25
IC4
IC6
CN8 (BL)
CN16 (W)
CN40 (W)
C52
C53
C54
TP11
TP23
TP21
TP22
TP24
E6
UP-5100 ONLY
UP-5150 ONLY


A
B
C
D
E
F
G
H
J
K
1
2
3
4
5
RV1
E3
TP37
S6
S5
ON
OFF
TP36
TP38
E2
E4
CN6 (Y)
CN3 (W)
CN4 (BK)
CN5 (BL)
CN30 (W)
W1
CN1 (BL)
C49
L1
C48
CN2 (W)
CN15 (W)
CN20 (W)
C51
TP10
TP19
TP26
TP25
IC2
IC1
FL1
FL2
FL3
FL4
FL5
X2
TP31
TP32
TP33
TP34
TP35
TP29
TP30
C45
C41
C43
C8
TP9
TP13
CN19 (Y)
CN41 (BK)
TP6
C3
CN14 (BL)
IC4
SL2
TP28
TP27
TP20
IC3
TP1
TP4
TP3
TP2
SL1
IC5
R16
TP5
CN13 (BK)
IC19
IC6
IC18
D2
IC9
C27
C19
C52
IC7
R13
TP14
CN7 (BK)
R14
TP15
CN21 (BL)
X1
TP18
TP7
X3
IC8
R15
Q3
C1
C2
CN17 (W)
CN40 (W)
SY-9
1-641-459-11
C53
IC11
A No.
LOT No.
S No.
R19
D1
CN22 (Y)
C20
TP16
TP17
IC10
E5
SONY
MADE IN JAPAN
C5
Q6
Q8
Q10
CN18 (W)
TP8
DIP
Ⓐ
TH1
C54
Q9
Q5
Q7
Q4
R24
TP12
CN11 (BK)
CN10 (W)
CN12 (R)
CN9 (W)
E1
IS-77 TV-0
UP-5100 ONLY
UP-5150 ONLY

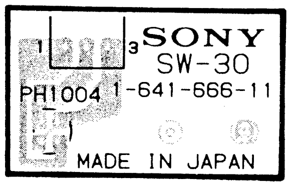
SY-9 —COMPONENT SIDE—
1-641-459-11

● : Conductor side pattern

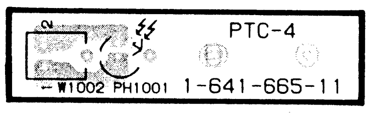
● : Component side pattern

SY-9	Board	
CN1	G-1	
CN2	J-1	
CN3	B-1	
CN4	C-1	
CN5	D-1	
CN6	A-1	
CN7	K-2	
CN8	A-3	
CN9	K-5	
CN10	J-5	
CN11	K-5	
CN12	J-5	
CN13	K-2	
CN14	K-1	
CN15	K-1	
CN16	A-4	
CN17	K-4	
CN18	K-5	
CN19	K-1	
CN20	K-1	
CN21	K-3	
CN22	K-4	
CN30	F-1	
CN40	B-4	
CN41	K-1	
D1	J-4	
D2	D-3	
D3	K-5	S
D4	K-4	S
D5	K-5	S
D6	K-4	S
D7	K-5	S
D9	K-5	S
D11	K-4	S
E1	K-5	
E2	K-1	
E3	G-1	
E4	A-1	
E5	F-4	
E6	A-5	
FL1	F-1	
FL2	F-1	
FL3	F-1	
FL4	F-1	
FL5	F-2	
IC1	E-1	
IC2	C-1	
IC3	C-3	
IC4	B-1	
IC5	G-1	
IC6	B-2	
IC7	H-2	
IC8	H-3	
IC9	D-3	
IC10	E-4	
IC11	G-3	
IC12	A-5	S
IC13	B-5	S
IC14	A-1	S
IC15	B-3	S
IC16	A-4	S
IC17	B-4	S
IC18	E-3	
IC19	K-2	
IC20	E-5	S
IC21	C-5	S
IC22	C-4	S
IC23	A-3	S
IC24	E-2	S
IC25	C-3	S
IC26	H-5	S
IC27	K-1	S
IC28	J-1	S
IC29	D-5	S
L1	H-1	
Q1	H-4	S
Q2	H-5	S
Q3	K-4	
Q4	K-5	
Q5	J-5	
Q6	J-5	
Q7	K-5	
Q8	K-5	
Q9	J-5	
Q10	K-5	
Q11	K-4	S
Q12	K-5	S
RV1	G-1	
S1	A-1	
S3	A-1	
S4	A-2	
S5	H-1	
S6	H-1	
TH1	G-5	
TP1	D-2	
TP2	D-2	
TP3	D-2	
TP4	D-2	
TP5	K-2	
TP6	K-1	
TP7	F-4	
TP8	E-5	
TP9	K-1	
TP10	K-1	
TP11	A-4	
TP12	K-5	
TP13	K-1	
TP14	K-2	
TP15	K-3	
TP16	D-4	
TP17	D-4	
TP18	D-4	
TP19	C-1	
TP20	C-1	
TP21	A-4	
TP22	A-5	
TP23	A-4	
TP24	A-5	
TP25	B-1	
TP26	A-1	
TP27	C-1	
TP28	C-1	
TP29	H-1	
TP30	H-1	
TP31	G-1	
TP32	G-1	
TP33	G-1	
TP34	G-1	
TP35	G-2	
TP36	J-1	
TP37	H-1	
TP38	J-1	
W1	G-1	
X1	C-4	
X2	F-1	
X3	F-4	

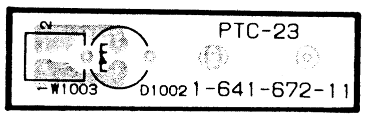
SY-9 — 1/2 — (SERVO/SYSTEM CONTROL) SW-30 (RB ROT SENSOR) SW-31 (HD POSITION SENSOR) SW-32 (CASSETTE SW) SW-35 (
PTC-24 (RB CODE SENSOR) PTC-25 (JAM LED) PTC-26 (JAM SENSOR) S-8 (TRAY SENSOR) SU-4 (RB MOTOR) SU-5 (HD UP/DOWN M


SONY
SW-30
PH1004 1-641-666-11
MADE IN JAPAN

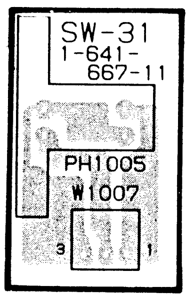
SW-30 –SOLDERING SIDE–
1-641-666-11


PTC-4
W1002 PH1001 1-641-665-11

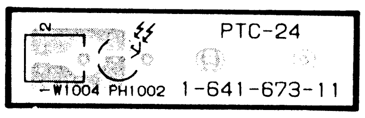
PTC-4 –SOLDERING SIDE–
1-641-665-11


PTC-23
W1003 D1002 1-641-672-11

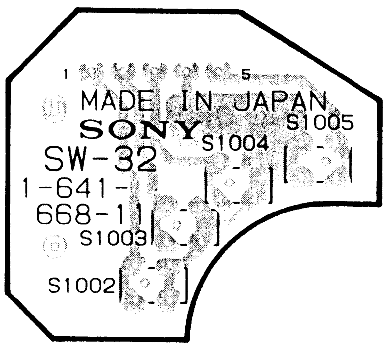
PTC-23 –SOLDERING SIDE–
1-641-672-11


SW-31
1-641-
667-11
PH1005
W1007

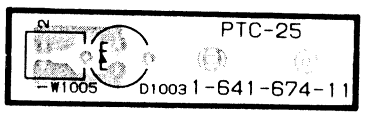
SW-31 –SOLDERING SIDE–
1-641-667-11


PTC-24
W1004 PH1002 1-641-673-11

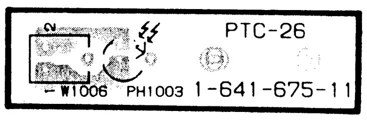
PTC-24 –SOLDERING SIDE–
1-641-673-11


MADE IN JAPAN
SONY
SW-32
S1005
S1004
1-641-
668-11
S1003
S1002

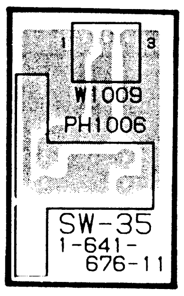
SW-32 –SOLDERING SIDE–
1-641-668-11


PTC-25
W1005 D1003 1-641-674-11

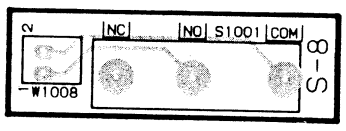
PTC-25 –SOLDERING SIDE–
1-641-674-11


PTC-26
W1006 PH1003 1-641-675-11

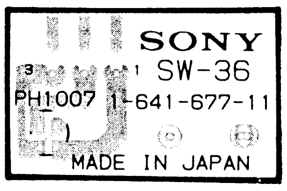
PTC-26 –SOLDERING SIDE–
1-641-675-11


W1009
PH1006
SW-35
1-641-
676-11

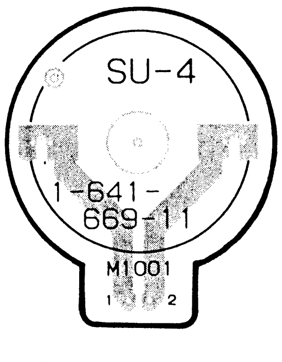
SW-35 –SOLDERING SIDE–
1-641-676-11


NC
NO
S1001
COM
W1008
S-8

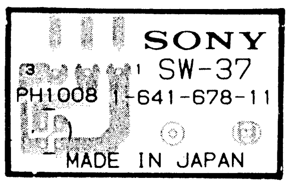
S-8 –SOLDERING SIDE–
1-641-671-11


SONY
SW-36
PH1007 1-641-677-11
MADE IN JAPAN

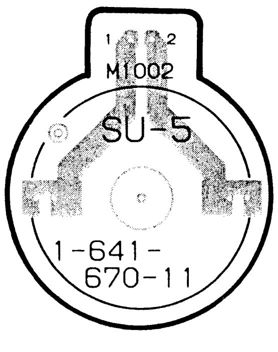
SW-36 –SOLDERING SIDE–
1-641-677-11


SU-4
1-641-
669-11
M1001

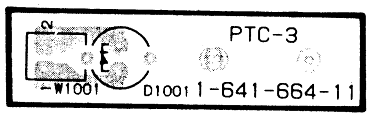
SU-4 –SOLDERING SIDE–
1-641-669-11


SONY
SW-37
PH1008 1-641-678-11
MADE IN JAPAN

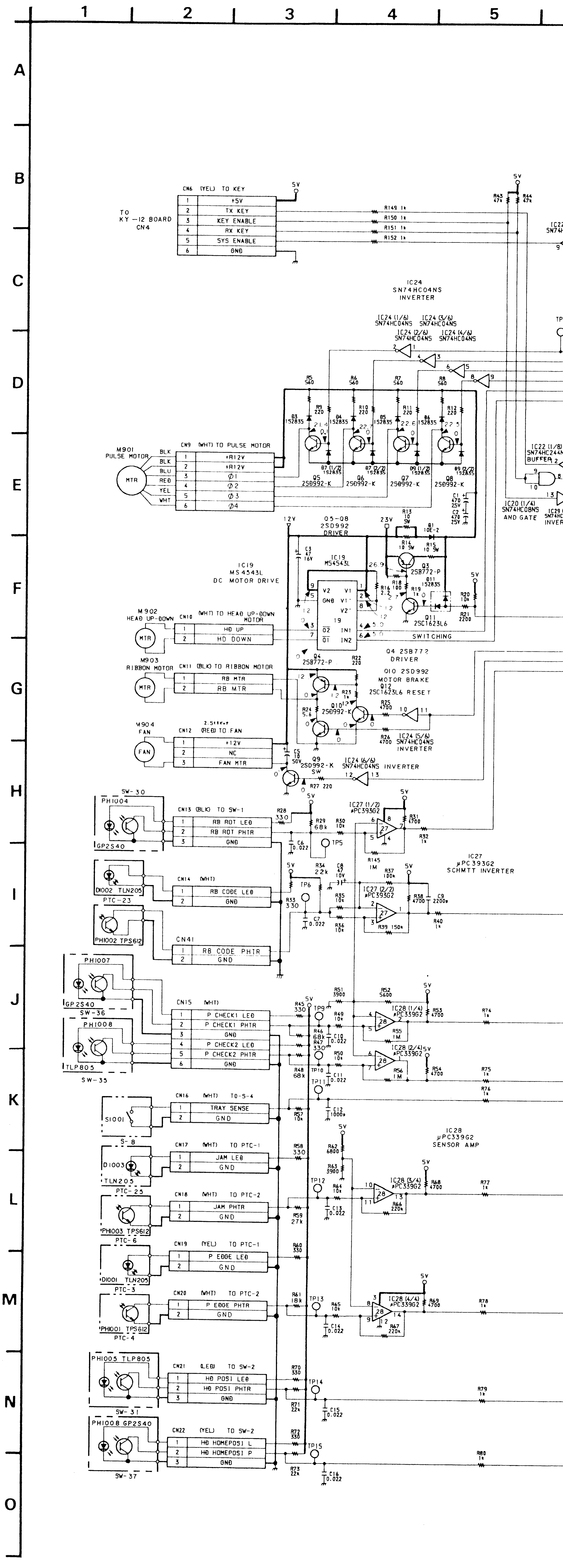
SW-37 –SOLDERING SIDE–
1-641-678-11


M1002
SU-5
1-641-
670-11

SU-5 –SOLDERING SIDE–
1-641-670-11

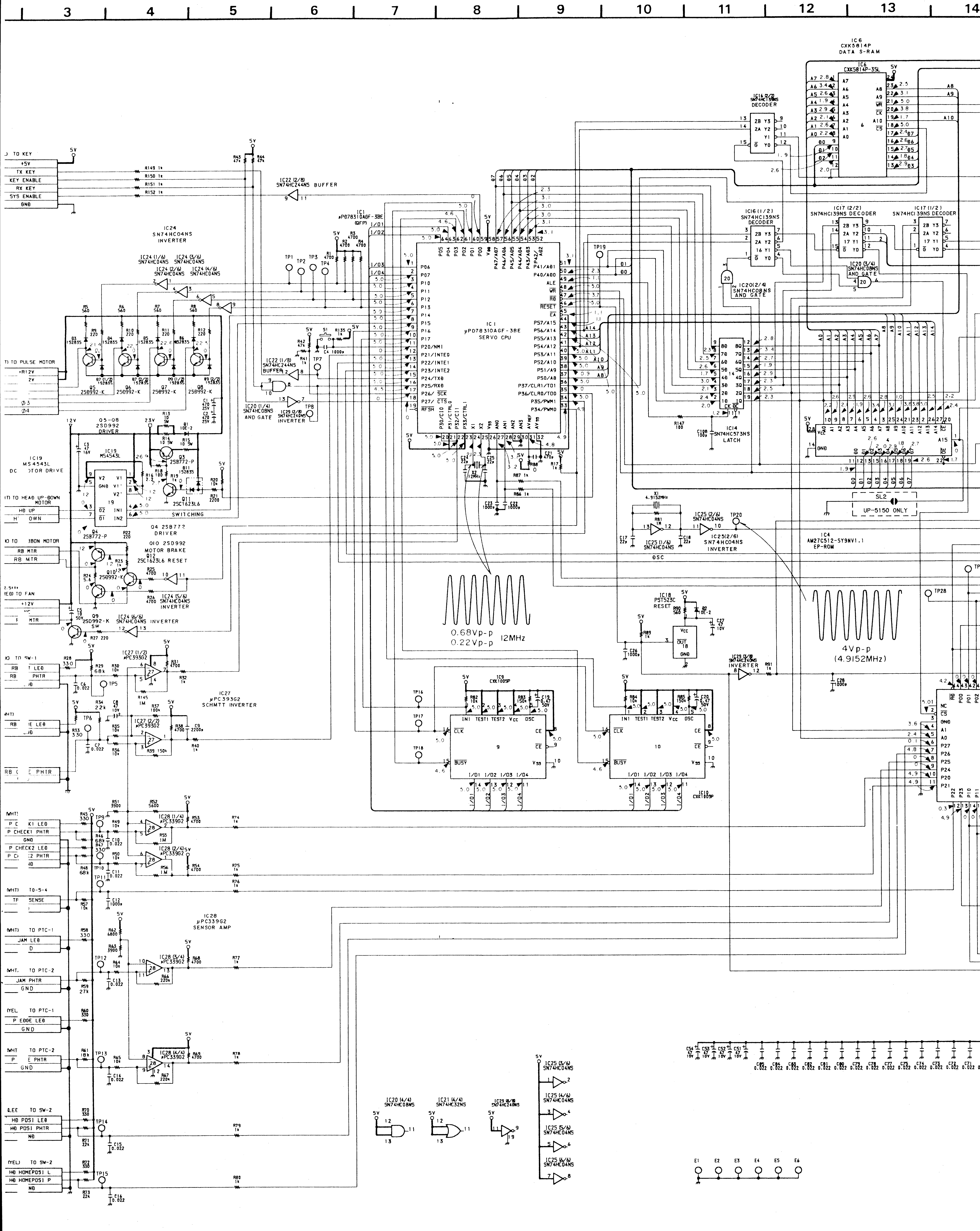

PTC-3
W1001 D1001 1-641-664-11

PTC-3 –SOLDERING SIDE–
1-641-664-11

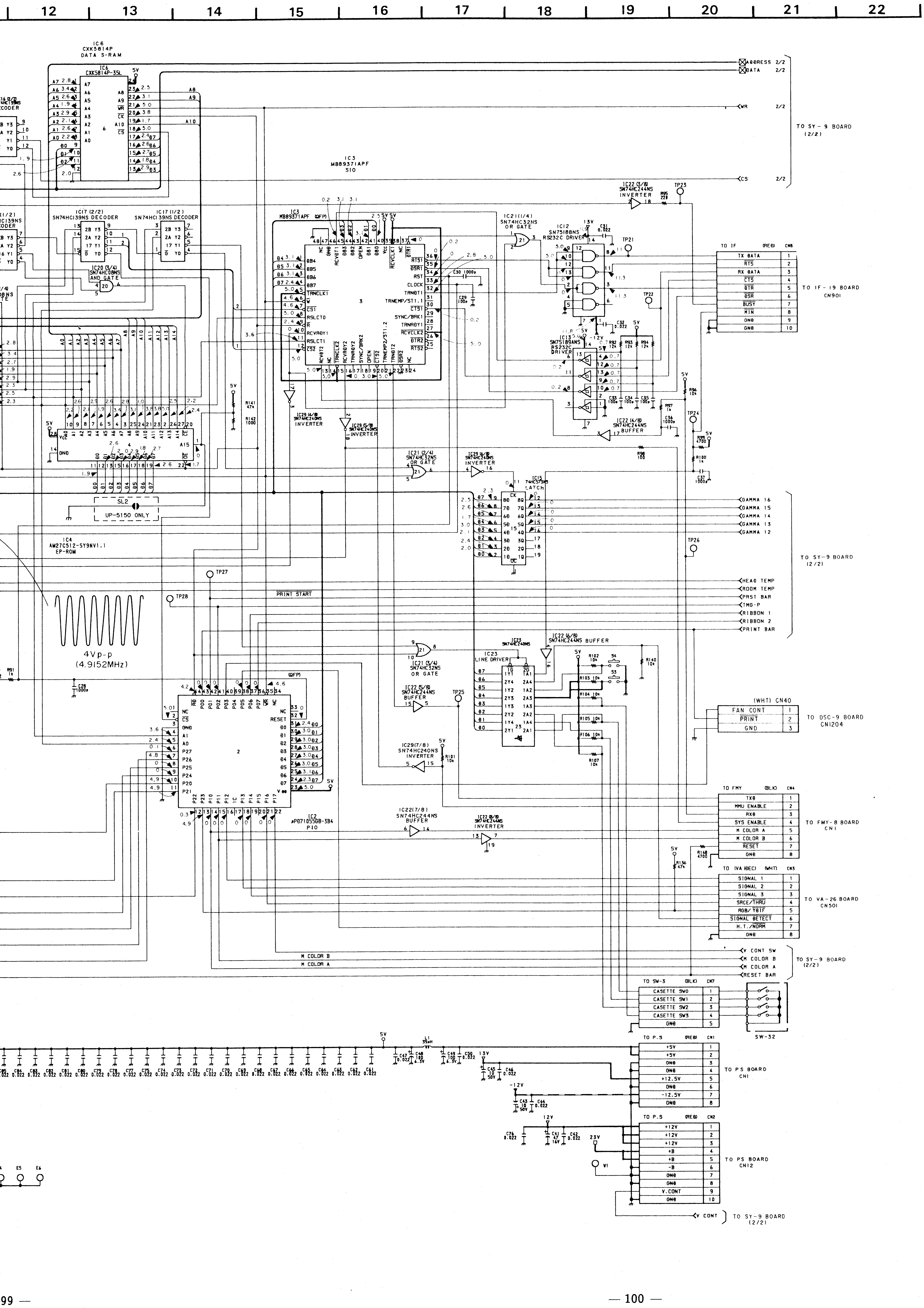

1
2
3
4
5
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
TO KY-12 BOARD CN4
CN6 (YEL) TO KEY
+5V
TX KEY
KEY ENABLE
RX KEY
SYS ENABLE
GND
IC24 SN74HC04NS INVERTER
M901 PULSE MOTOR
CN9 (WHT) TO PULSE MOTOR
+R12V
Φ1
Φ2
Φ3
Φ4
IC19 MS4543L DC MOTOR DRIVE
Q5-Q8 2SD992 DRIVER
M902 HEAD UP-DOWN
CN10 (WHT) TO HEAD UP-DOWN MOTOR
HD UP
HD DOWN
SWITCHING
Q4 2SB772 DRIVER
Q10 2SD992 MOTOR BRAKE
Q12 2SC1623L6 RESET
M903 RIBBON MOTOR
CN11 (BLK) TO RIBBON MOTOR
RB MTR
M904 FAN
CN12 (RED) TO FAN
+12V
NC
FAN MTR
IC24 (5/6) SN74HC04NS INVERTER
IC22 (1/8) SN74HC244 BUFFER
IC20 (1/4) SN74HC08NS AND GATE
SW-30
PH1004
GP2S40
CN13 (BLK) TO SW-1
RB ROT LED
RB ROT PHTR
GND
IC27 µPC393G2 SCHMITT INVERTER
D1002 TLN205
PTC-23
CN14 (WHT)
RB CODE LED
PH1002 TPS612
CN41
RB CODE PHTR
PH1007
GP2S40
SW-36
PH1008
TLP805
SW-35
CN15 (WHT)
P CHECK1 LED
P CHECK1 PHTR
P CHECK2 LED
P CHECK2 PHTR
IC28 µPC339G2 SENSOR AMP
S1001
S-8
CN16 (WHT) TO S-4
TRAY SENSE
D1003
TLN205
PTC-25
CN17 (WHT) TO PTC-1
JAM LED
PH1003 TPS612
PTC-6
CN18 (WHT) TO PTC-2
JAM PHTR
D1001 TLN205
PTC-3
CN19 (YEL) TO PTC-1
P EDGE LED
PH1001 TPS612
PTC-4
CN20 (WHT) TO PTC-2
P EDGE PHTR
PH1005 TLP805
SW-31
CN21 (LED) TO SW-2
HD POSI LED
HD POSI PHTR
PH1008 GP2S40
SW-37
CN22 (YEL) TO SW-2
HD HOMEPOSI L
HD HOMEPOSI P

N SENSOR) SW-32 (CASSETTE SW) SW-35 (P CHECK2 SENSOR) SW-36 (P CHECK1 SENSOR) SW-37 (HD HOME POSITION SENSOR) PTC-3 (P EDGE LED

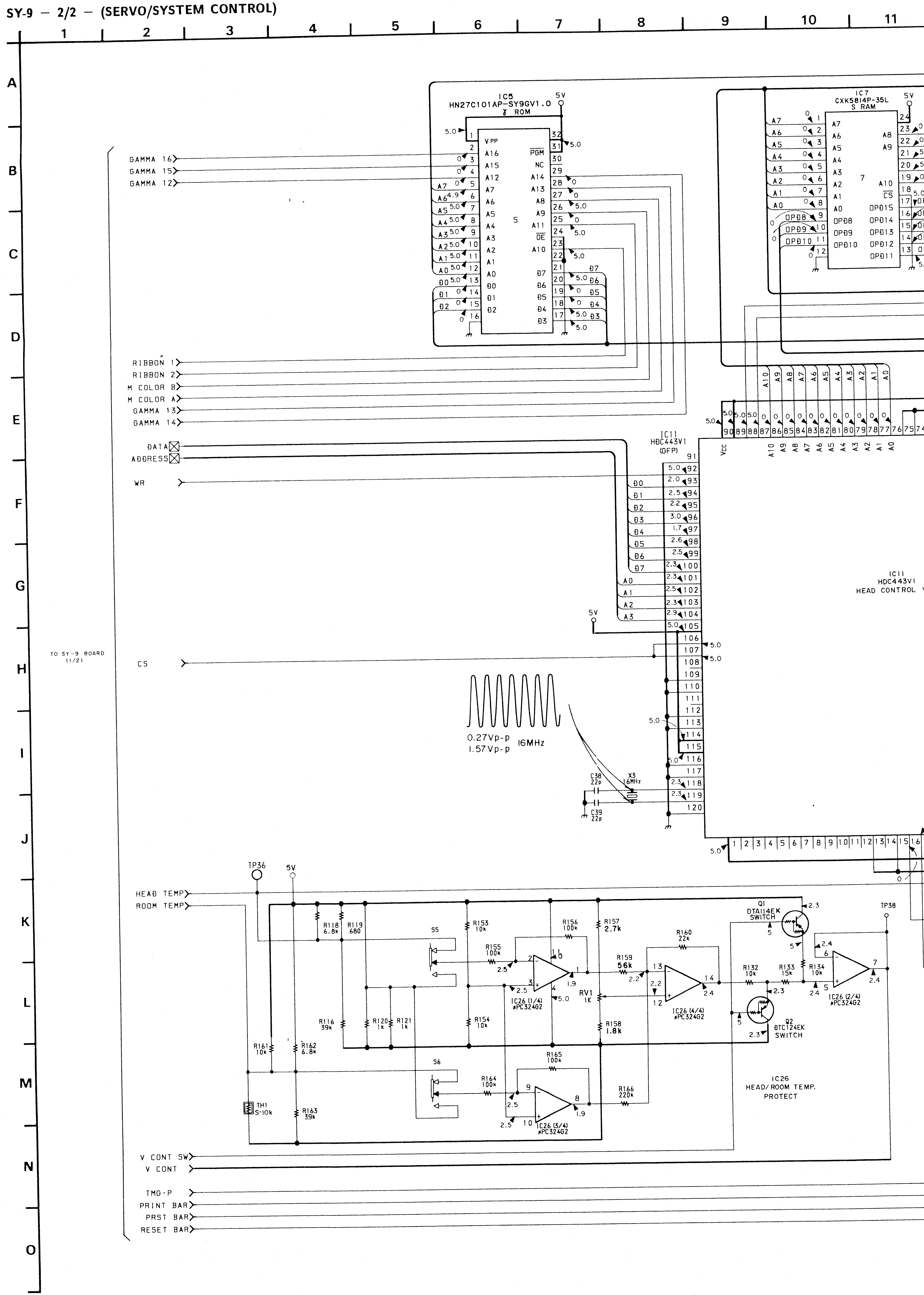
SU-4 (RB MOTOR) SU-5 (HD UP/DOWN MOTOR)

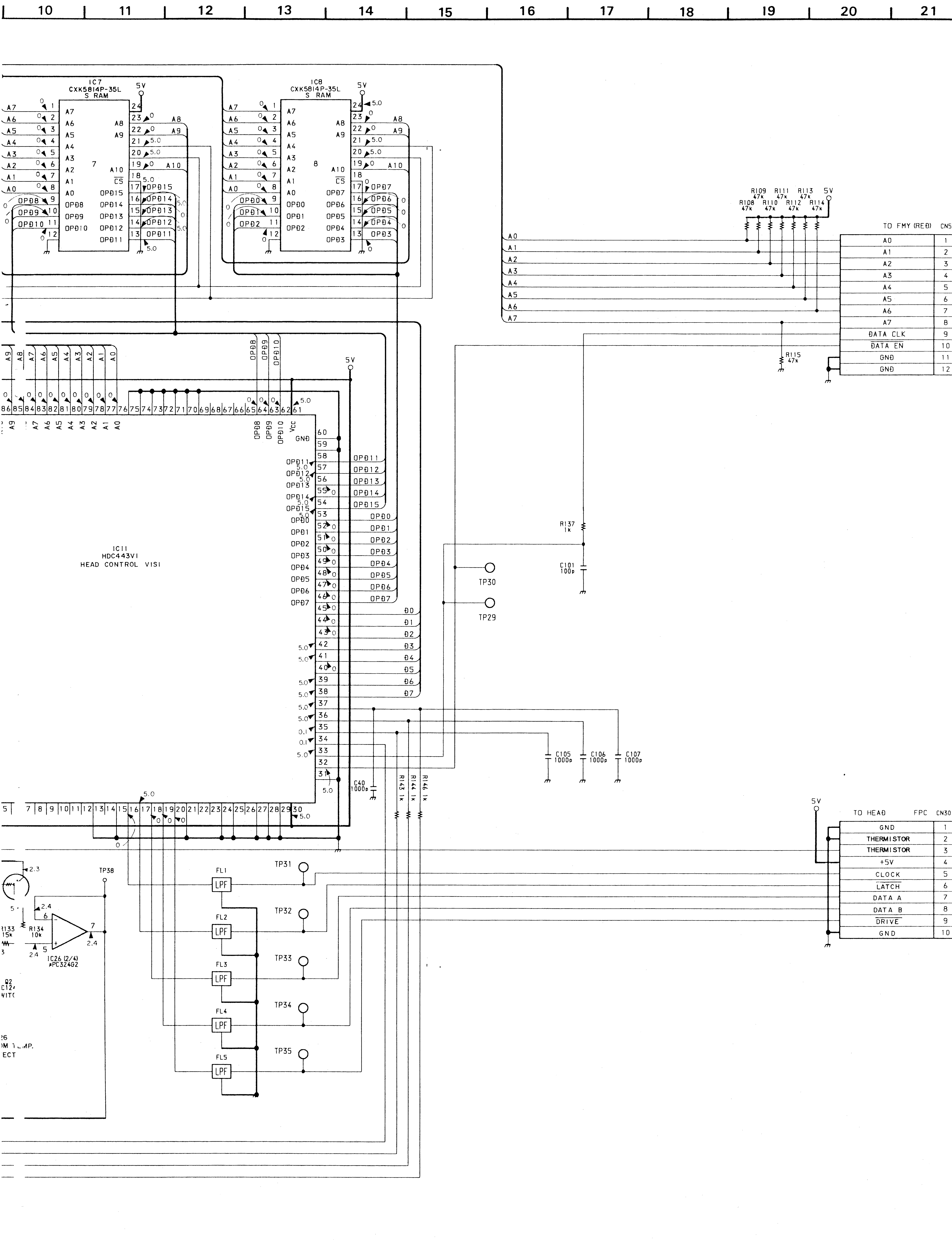

3
4
5
6
7
8
9
10
11
12
13
14
IC6 CXK5814P DATA S-RAM
CXK5814P-35L
IC16 (2/2) SN74HC139NS DECODER
IC16 (1/2) SN74HC139NS DECODER
IC17 (2/2) SN74HC139NS DECODER
IC17 (1/2) SN74HC139NS DECODER
IC20 (3/4) SN74HC08NS AND GATE
IC20 (2/4) SN74HC08NS AND GATE
IC1 μPD78310AGF-3BE (QFP)
IC1 μPD78310AGF-3BE SERVO CPU
IC22 (2/8) SN74HC244NS BUFFER
IC22 (1/8) SN74HC244NS BUFFER
IC20 (1/4) SN74HC08NS AND GATE
IC29 (2/8) SN74HC240NS INVERTER
IC24 SN74HC04NS INVERTER
IC19 MS4543L DC MOTOR DRIVE
IC19 M54543L
Q5-Q8 2SD992 DRIVER
Q3 2SB772-P
Q11 2SC1623L6 SWITCHING
Q4 2SB772 DRIVER
Q10 2SD992 MOTOR BRAKE
Q12 2SC1623L6 RESET
IC24 (5/6) SN74HC04NS INVERTER
IC24 (6/6) SN74HC04NS INVERTER
IC27 (1/2) μPC393G2
IC27 (2/2) μPC393G2
IC27 μPC393G2 SCHMITT INVERTER
IC28 (1/4) μPC339G2
IC28 (2/4) μPC339G2
IC28 (3/4) μPC339G2
IC28 (4/4) μPC339G2
IC28 μPC339G2 SENSOR AMP
IC14 SN74HC573NS LATCH
IC4 AM27C512-SY9NV1.1 EP-ROM
SL2
UP-5150 ONLY
X1 4.9152MHz
IC25 (1/6) SN74HC04NS
IC25 (2/6) SN74HC04NS INVERTER
OSC
IC18 PST523C RESET
IC29 (3/8) SN74HC240NS INVERTER
IC9 CXK1005P
IC10 CXK1005P
0.68Vp-p
0.22Vp-p 12MHz
4Vp-p (4.9152MHz)
IC20 (4/4) SN74HC08NS
IC21 (4/4) SN74HC32NS
IC29 (8/8) SN74HC240NS
IC25 (3/6) SN74HC04NS
IC25 (4/6) SN74HC04NS
IC25 (5/6) SN74HC04NS
IC25 (6/6) SN74HC04NS
E1 E2 E3 E4 E5 E6
TO KEY
+5V
TX KEY
KEY ENABLE
RX KEY
SYS ENABLE
GND
TO PULSE MOTOR
+R12V
TO HEAD UP-DOWN MOTOR
HD UP
TO RB MOTOR
RB MTR
TO FAN
+12V
P CHECK1 LED
P CHECK1 PHTR
P CHECK2 LED
JAM LED
JAM PHTR
P EDGE LED
P EDGE PHTR
HD POSI LED
HD POSI PHTR
HD HOMEPOSI L
HD HOMEPOSI P
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
TP18
TP19
TP20
TP28

TION SENSOR) PTC-3 (P EDGE LED) PTC-4 (P EDGE SENSOR) PTC-23 (RB CODE LED)


12
13
14
15
16
17
18
19
20
21
22
IC6 CXK5814P DATA S-RAM
IC6 CXK5814P-35L
IC17 (2/2) SN74HC139NS DECODER
IC17 (1/2) SN74HC139NS DECODER
IC20 (3/4) SN74HC08NS AND GATE
IC3 MB89371APF SIO
IC3 MB89371APF (QFP)
IC21 (1/4) SN74HC32NS OR GATE
IC12 SN75188NS RS232C DRIVER
IC13 SN75189ANS RS232C DRIVER
IC22 (3/8) SN74HC244NS INVERTER
IC22 (4/8) SN74HC244NS BUFFER
IC29 (4/8) SN74HC240NS INVERTER
IC29 (5/8) SN74HC240NS INVERTER
IC21 (2/4) SN74HC32NS OR GATE
IC15 74HC573NS LATCH
IC4 AM27C512-SY9NV1.1 EP-ROM
SL2
UP-5150 ONLY
4Vp-p
(4.9152MHz)
PRINT START
IC23 SN74HC240NS LINE DRIVER
IC22 (6/8) SN74HC244NS BUFFER
IC21 (3/4) SN74HC32NS OR GATE
IC22 (5/8) SN74HC244NS BUFFER
IC29 (7/8) SN74HC240NS INVERTER
IC2 µPD71055GB-3B4 PIO
IC22 (7/8) SN74HC244NS BUFFER
IC22 (8/8) SN74HC244NS INVERTER
ADDRESS 2/2
DATA 2/2
WR 2/2
CS 2/2
TO SY-9 BOARD (2/2)
TO IF (RED) CN8
TX DATA
RTS
RX DATA
CTS
DTR
DSR
BUSY
MIN
GND
GND
TO IF-19 BOARD CN901
GAMMA 16
GAMMA 15
GAMMA 14
GAMMA 13
GAMMA 12
TO SY-9 BOARD (2/2)
HEAD TEMP
ROOM TEMP
PRST BAR
TMG-P
RIBBON 1
RIBBON 2
PRINT BAR
(WHT) CN40
FAN CONT
PRINT
GND
TO DSC-9 BOARD CN1204
TO FMY (BLK) CN4
TXD
MMU ENABLE
RXD
SYS ENABLE
M COLOR A
M COLOR B
RESET
GND
TO FMY-8 BOARD CN1
TO VA (DEC) (WHT) CN5
SIGNAL 1
SIGNAL 2
SIGNAL 3
SRCE/THRU
RGB/YDIF
SIGNAL DETECT
H.T./NORM
GND
TO VA-26 BOARD CN501
M COLOR B
M COLOR A
V CONT SW
M COLOR B
M COLOR A
RESET BAR
TO SY-9 BOARD (2/2)
TO SW-3 (BLK) CN7
CASETTE SW0
CASETTE SW1
CASETTE SW2
CASETTE SW3
GND
SW-32
TO P.S (RED) CN1
+5V
+5V
GND
GND
+12.5V
GND
-12.5V
GND
TO PS BOARD CN1
TO P.S (RED) CN2
+12V
+12V
+12V
+B
+B
-B
GND
GND
V.CONT
GND
TO PS BOARD CN12
V CONT
TO SY-9 BOARD (2/2)
TP21
TP22
TP23
TP24
TP25
TP26
TP27
TP28
V1
E5
E6

SY-9 — 2/2 — (SERVO/SYSTEM CONTROL)


IC5
HN27C101AP-SY9GV1.0
γ ROM
IC7
CXK5814P-35L
S RAM
IC11
HDC443V1
(GFP)
IC11
HDC443V1
HEAD CONTROL
GAMMA 16
GAMMA 15
GAMMA 12
RIBBON 1
RIBBON 2
M COLOR B
M COLOR A
GAMMA 13
GAMMA 14
DATA
ADDRESS
WR
CS
TO SY-9 BOARD (1/2)
0.27Vp-p
1.57Vp-p
16MHz
X3
16MHz
C38 22p
C39 22p
HEAD TEMP
ROOM TEMP
TP36
5V
TP38
Q1
DTA114EK
SWITCH
Q2
DTC124EK
SWITCH
IC26 (1/4)
μPC324G2
IC26 (2/4)
μPC324G2
IC26 (3/4)
μPC324G2
IC26 (4/4)
μPC324G2
IC26
HEAD/ROOM TEMP.
PROTECT
S5
S6
RV1 1K
TH1 S-10k
R118 6.8k
R119 680
R153 10k
R155 100k
R156 100k
R157 2.7k
R159 56k
R160 22k
R132 10k
R133 15k
R134 10k
R116 39k
R120 1k
R121 1k
R154 10k
R158 1.8k
R161 10k
R162 6.8k
R163 39k
R164 100k
R165 100k
R166 220k
V CONT SW
V CONT
TMG·P
PRINT BAR
PRST BAR
RESET BAR


10
11
12
13
14
15
16
17
18
19
20
21
IC7
CXK5814P-35L
S RAM
IC8
CXK5814P-35L
S RAM
5V
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
CS
OPD0
OPD1
OPD2
OPD3
OPD4
OPD5
OPD6
OPD7
OPD8
OPD9
OPD10
OPD11
OPD12
OPD13
OPD14
OPD15
IC11
HDC443V1
HEAD CONTROL VISI
Vcc
GND
D0
D1
D2
D3
D4
D5
D6
D7
R109 47k
R111 47k
R113 47k
R108 47k
R110 47k
R112 47k
R114 47k
R115 47k
TO FMY (RED)
CN5
DATA CLK
DATA EN
R137 1k
C101 100p
TP30
TP29
C105 1000p
C106 1000p
C107 1000p
C40 1000p
R143 1k
R144 1k
R146 1k
TO HEAD
FPC
CN30
GND
THERMISTOR
THERMISTOR
+5V
CLOCK
LATCH
DATA A
DATA B
DRIVE
TP31
TP32
TP33
TP34
TP35
TP38
FL1
FL2
FL3
FL4
FL5
LPF
R133 15k
R134 10k
IC26 (2/4)
μPC324G2
Q2
5.0
2.4
2.3

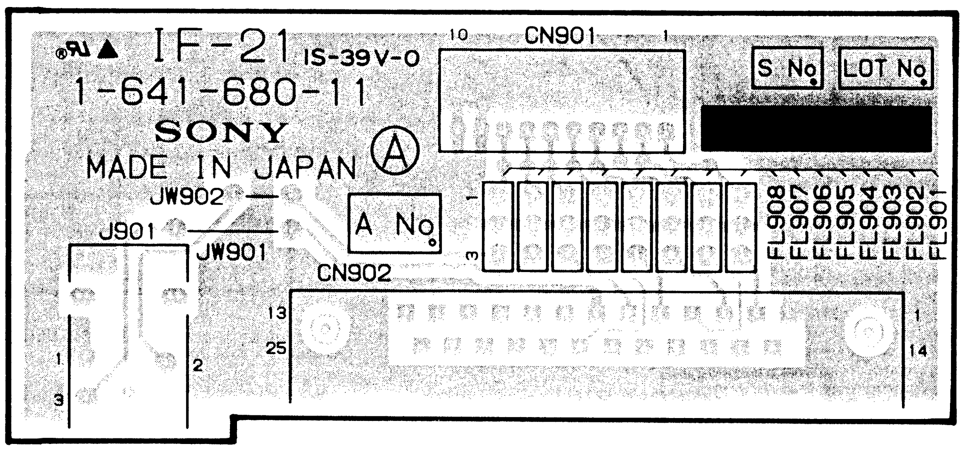
O FMY (REĐ)	CN5
0	1
1	2
2	3
3	4
4	5
5	6
6	7
7	8
CLK	9
A EN	10
NĐ	11
NĐ	12

TO FMY-8 BOARD
CN3

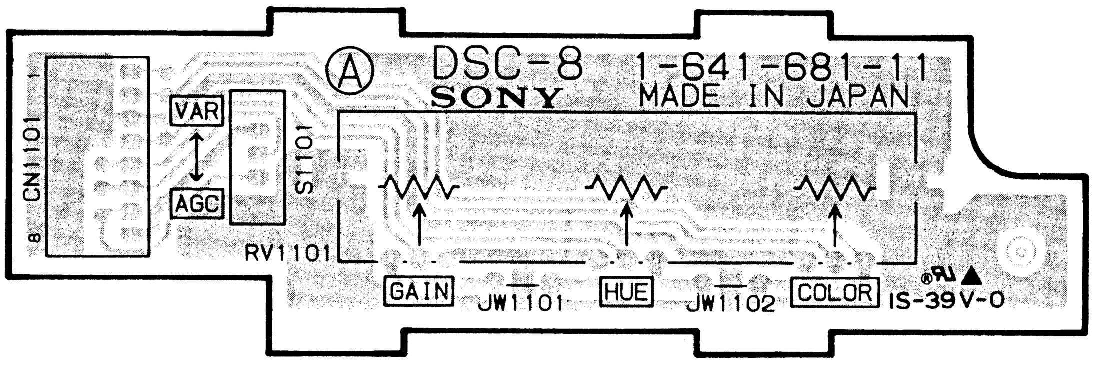
FPC	CN30
ND	1
IISTOR	2
IISTOR	3
5V	4
OCK	5
TCH	6
A A	7
A B	8
VE	9
ND	10

TO THERMAL
HEAD

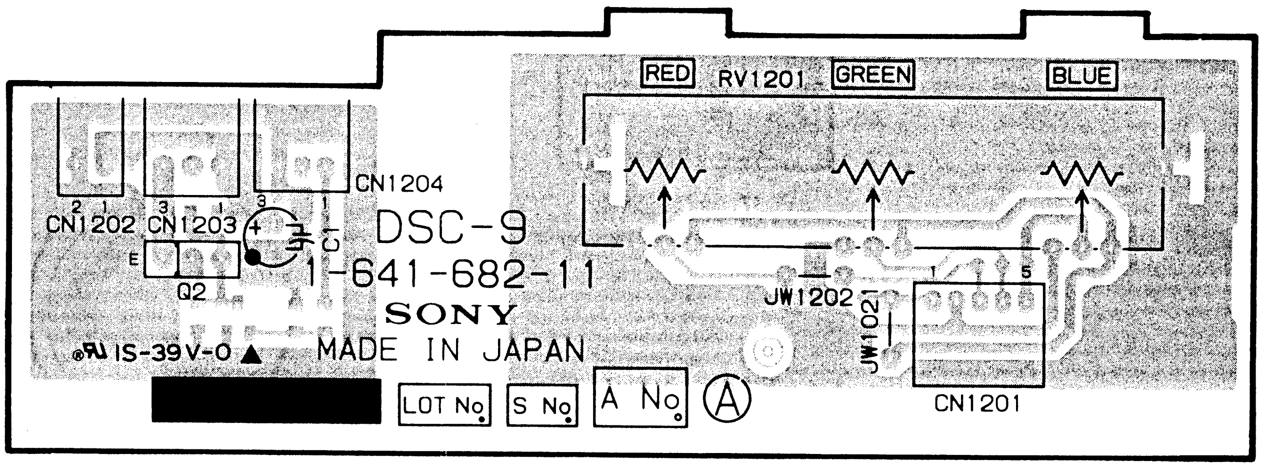
IF-21 (DATA INPUT/OUTPUT) DSC-8 (COLOR ADJUSTMENT)
DSC-9 (R.G.B. ADJUSTMENT, FAN MOTOR DRIVE)


IF-21
IS-39V-0
1-641-680-11
SONY
MADE IN JAPAN
Ⓐ
CN901
10
1
S No
LOT No
JW902
J901
JW901
A No
CN902
FL908
FL907
FL906
FL905
FL904
FL903
FL902
FL901
13
25
1
14
1
2
3

IF-21 –SOLDERING SIDE–
1-641-680-11

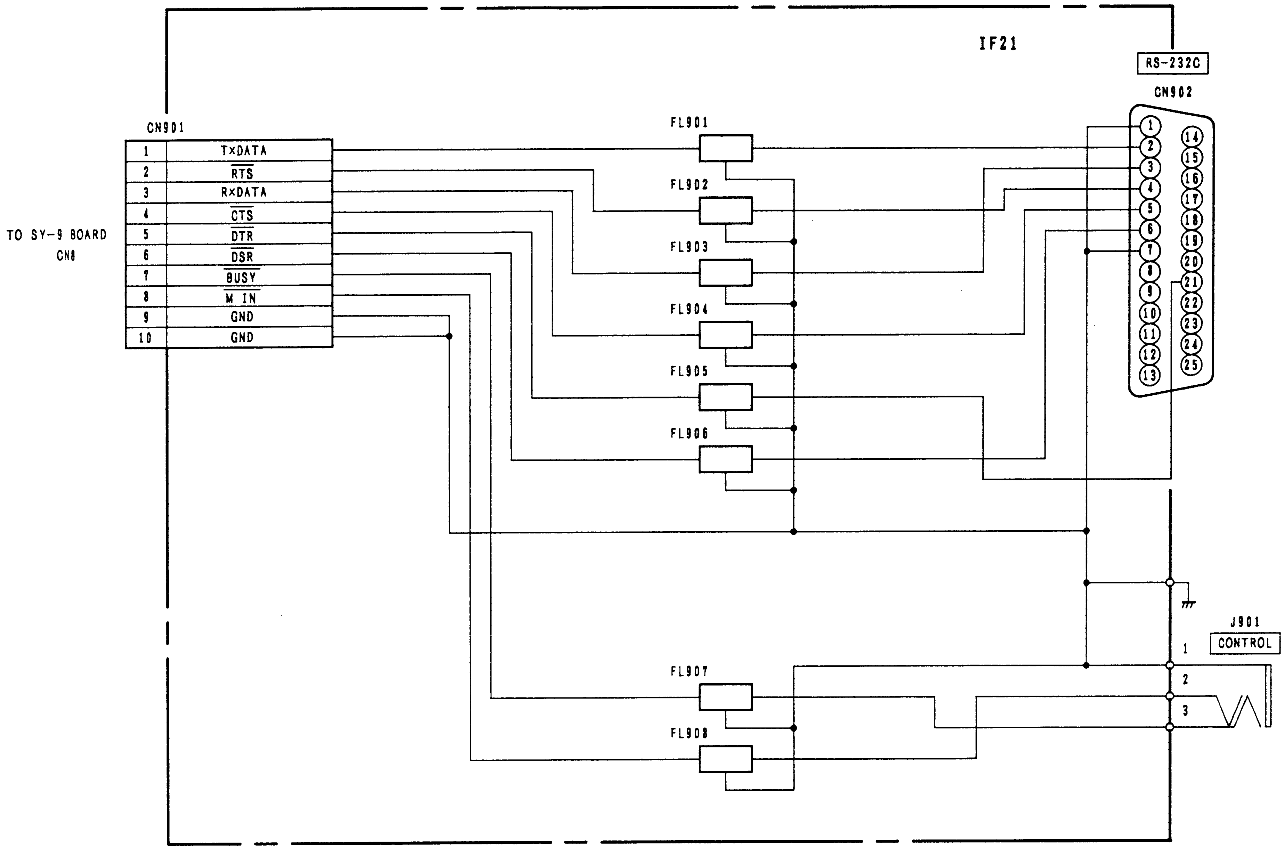

Ⓐ
DSC-8
1-641-681-11
SONY
MADE IN JAPAN
CN1101
1
8
VAR
AGC
S1101
RV1101
GAIN
JW1101
HUE
JW1102
COLOR
IS-39V-0

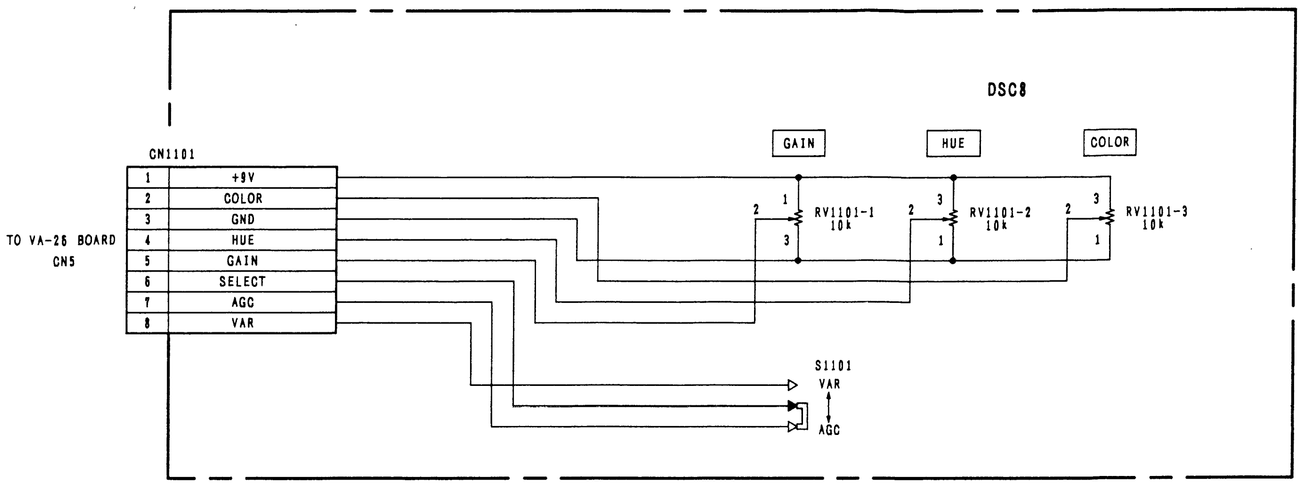
DSC-8 –SOLDERING SIDE–
1-641-681-11

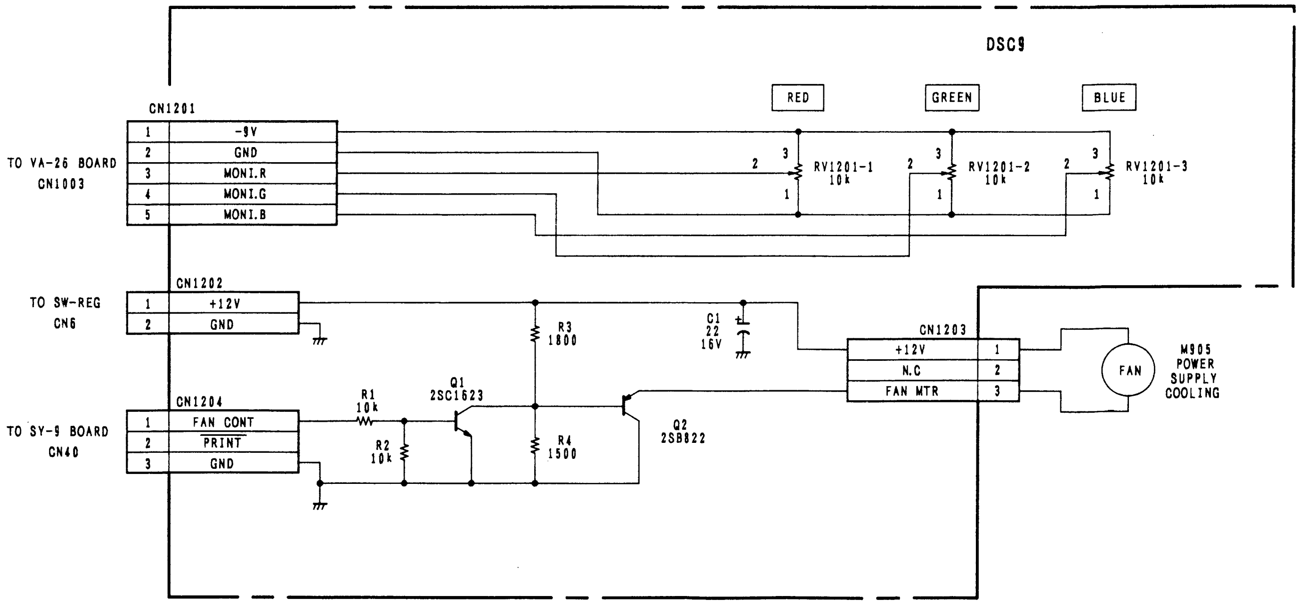

RED
RV1201
GREEN
BLUE
CN1204
CN1202
CN1203
2 1
3 1
3
E
Q2
C1
DSC-9
1-641-682-11
SONY
MADE IN JAPAN
IS-39V-0
JW1202
JW1021
1
5
CN1201
LOT No
S No
A No
Ⓐ

DSC-9 –SOLDERING SIDE–
1-641-682-11

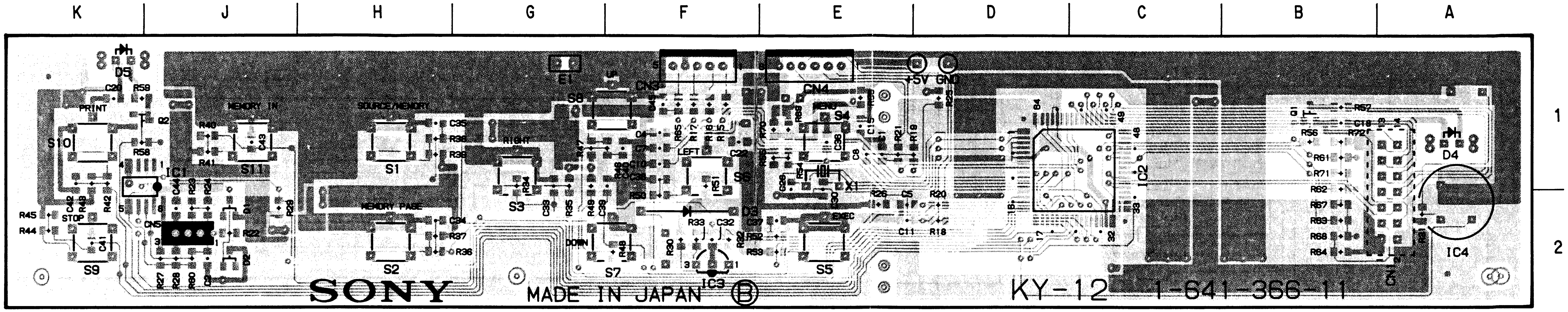
IF-21 (DATA INPUT/OUTPUT)   DSC-8 (COLOR ADJUSTMENT)   DSC-9 (R.G.B. ADJUSTMENT, FAN MOTOR DRIVE)


IF21
RS-232C
CN902
CN901
1 TxDATA
2 RTS
3 RxDATA
4 CTS
5 DTR
6 DSR
7 BUSY
8 M IN
9 GND
10 GND
TO SY-9 BOARD
CN8
FL901
FL902
FL903
FL904
FL905
FL906
FL907
FL908
1 2 3 4 5 6 7 8 9 10 11 12 13
14 15 16 17 18 19 20 21 22 23 24 25
J901
CONTROL
1
2
3


DSC8
CN1101
1 +9V
2 COLOR
3 GND
4 HUE
5 GAIN
6 SELECT
7 AGC
8 VAR
TO VA-26 BOARD
CN5
GAIN
HUE
COLOR
RV1101-1 10k
RV1101-2 10k
RV1101-3 10k
S1101
VAR
AGC


DSC9
CN1201
1 -9V
2 GND
3 MONI.R
4 MONI.G
5 MONI.B
TO VA-26 BOARD
CN1003
RED
GREEN
BLUE
RV1201-1 10k
RV1201-2 10k
RV1201-3 10k
CN1202
1 +12V
2 GND
TO SW-REG
CN6
CN1204
1 FAN CONT
2 PRINT
3 GND
TO SY-9 BOARD
CN40
R1 10k
R2 10k
Q1 2SC1623
R3 1800
R4 1500
Q2 2SB822
C1 22 16V
CN1203
+12V 1
N.C 2
FAN MTR 3
FAN
M905
POWER
SUPPLY
COOLING

KY-12 (FUNCTION SW)

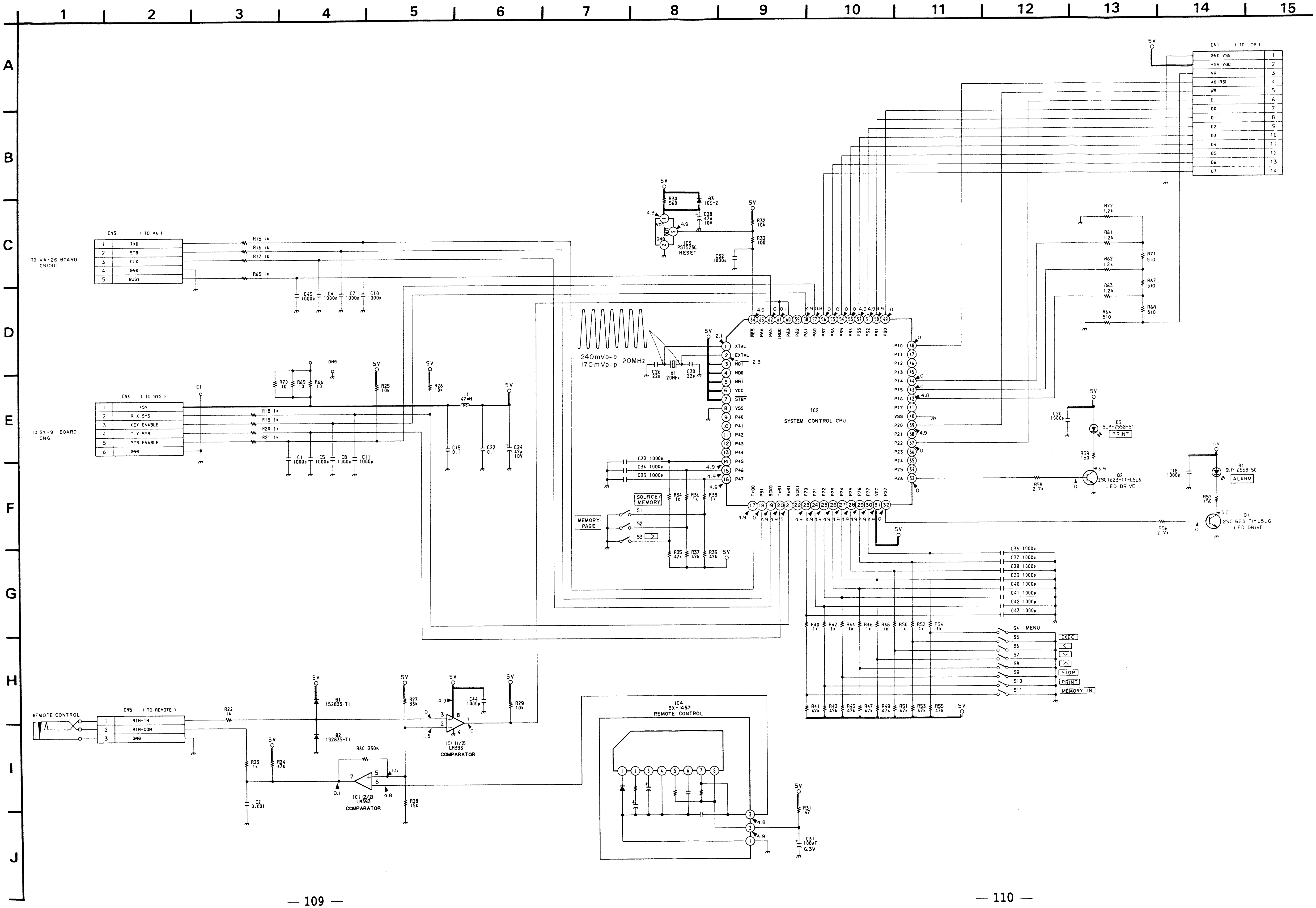

K
J
H
G
F
E
D
C
B
A
1
2
PRINT
S10
D5
C20
R59
Q2
R58
IC1
MEMORY IN
R40
R41
C43
S11
SOURCE/MEMORY
S1
C35
R36
MEMORY PAGE
S2
C34
R37
RIGHT
S3
R34
E1
UP
S8
CN3
LEFT
S6
DOWN
S7
IC3
R33
C32
D3
CN4
S4
X1
EXEC
S5
+5V
GND
IC2
R26
C5
R20
C11
R18
D4
IC4
CN1
R57
R56
R72
R61
R71
R62
R67
R69
R68
R64
R45
R44
STOP
S9
C41
CN5
R22
D1
D2
R27
R28
R60
SONY
MADE IN JAPAN
KY-12 1-641-366-11

KY-12 —SOLDERING SIDE—
1-641-366-11

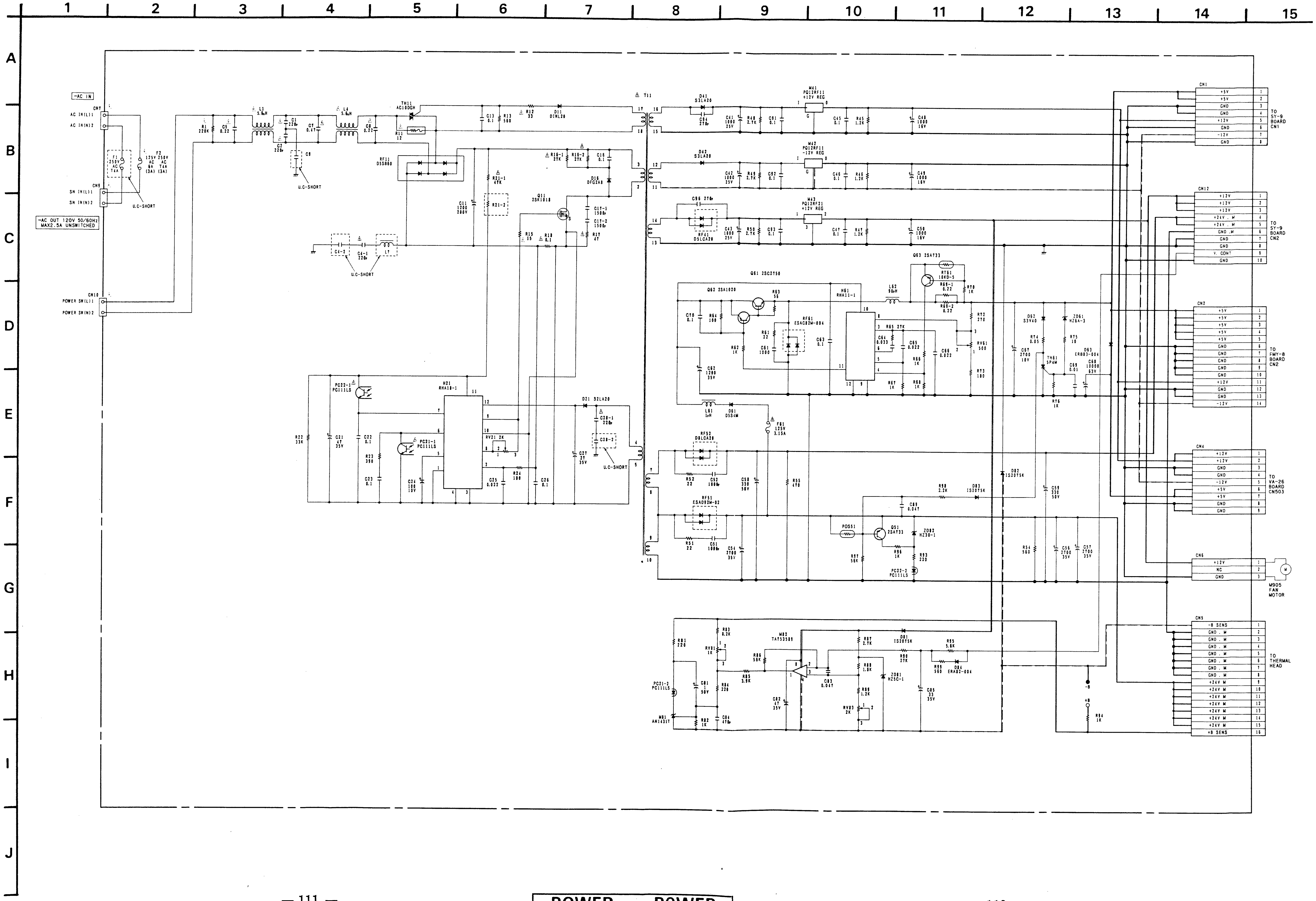
- ▨ : Conductor side pattern
- ▨ : Component side pattern

KY-12	Board	
CN1	B-1	
CN3	F-1	
CN4	E-1	
CN5	J-2	
D1	J-2	S
D2	J-2	S
D3	F-2	
D4	A-1	
D5	K-1	
E1	G-1	
IC1	J-1	S
IC2	C-1	S
IC3	F-2	
IC4	A-2	
L1	E-1	
Q1	B-1	S
Q2	J-1	S
S1	H-1	
S2	H-2	
S3	G-1	
S4	E-1	
S5	E-2	
S6	F-2	
S7	F-2	
S8	F-1	
S9	K-2	
S10	K-2	
S11	J-1	
X1	E-1	

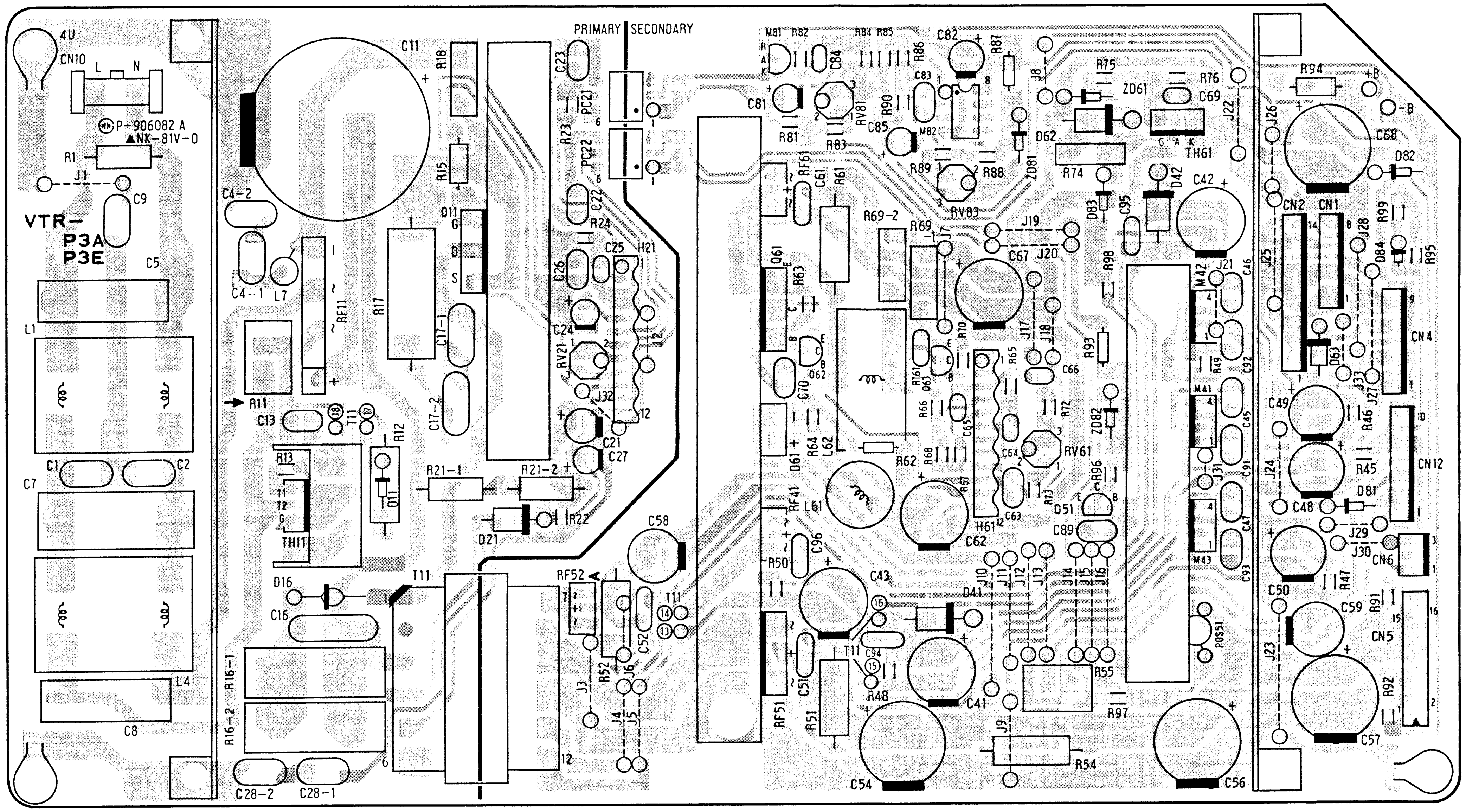
KY-12 (FUNCTION SW)


CN3 (TO VA)
TO VA-26 BOARD CN1001
TXD
STB
CLK
GND
BUSY
CN4 (TO SYS)
TO SY-9 BOARD CN6
+5V
R X SYS
KEY ENABLE
T X SYS
SYS ENABLE
GND
CN5 (TO REMOTE)
REMOTE CONTROL
RIM-IN
RIM-COM
GND
IC1 (1/2) LM393 COMPARATOR
IC1 (2/2) LM393 COMPARATOR
IC2 SYSTEM CONTROL CPU
IC3 PST523C RESET
IC4 BX-1457 REMOTE CONTROL
X1 20MHz
240mVp-p
170mVp-p
20MHz
SOURCE/MEMORY
MEMORY PAGE
S1
S2
S3
S4 MENU
S5 EXEC
S6
S7
S8
S9 STOP
S10 PRINT
S11 MEMORY IN
CN1 (TO LCD)
GND VSS
+5V VDD
VR
A0 (RS)
WR
E
D0
D1
D2
D3
D4
D5
D6
D7
D5 SLP-255B-51 PRINT
D4 SLP-655B-50 ALARM
Q2 2SC1623-T1-L5L6 LED DRIVE
Q1 2SC1623-T1-L5L6 LED DRIVE
D1 1S2835-T1
D2 1S2835-T1
D3 10E-2
5V

VTR-P3A (POWER SUPPLY)

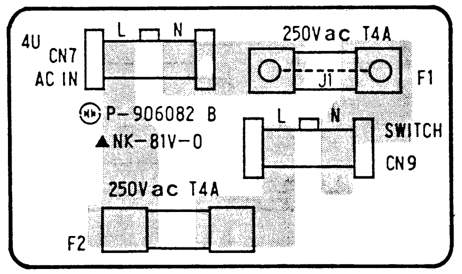

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
I
J
~AC IN
CN7
AC IN(L)1
AC IN(N)2
F1 250V AC T4A
F2 125V 250V AC AC 6A T4A (3A) (3A)
CN9
SN IN(L)1
SN IN(N)2
U.C-SHORT
~AC OUT 120V 50/60Hz MAX2.5A UNSWITCHED
CN10
POWER SW(L)1
POWER SW(N)2
R1 220K
C5 0.22
L1 5.6mH
C1 220p
C2 220p
C7 0.47
L4 5.6mH
C8 0.22
C9
TH11 AC10DGH
R11 12
RF11 D5SB60
C4-2
C4-1 220p
L7
C11 1200 200V
C13 0.1
R13 560
R12 33
D11 DINL20
T11
R16-1 27K
R16-2 27K
C16 0.1
D16 DFG2A8
R21-1 47K
R21-2
Q11 2SK1018
C17-1 1500p
C17-2 1500p
R15 15
R18 0.1
R17 47
PC22-1 PC111LS
H21 RHA18-1
R22 33K
C21 47 35V
C22 0.1
R23 390
C23 0.1
PC21-1 PC111LS
C24 100 10V
RV21 2K
C25 0.022
R24 100
C26 0.1
D21 S2LA20
C28-1 220p
C28-2
C27 27 35V
D41 S3LA20
C94 270p
C41 1000 25V
R48 2.7K
C91 0.1
M41 PQ12RF11 +12V REG
C45 0.1
R45 1.2K
C48 1000 16V
D42 S3LA20
C42 1000 25V
R49 2.7K
C92 0.1
M42 PQ12RF11 -12V REG
C46 0.1
R46 1.2K
C49 1000 16V
C96 270p
RF41 D5LCA20
C43 1000 25V
R50 2.7K
C93 0.1
M43 PQ12RF21 +12V REG
C47 0.1
R47 1.2K
C50 1000 16V
Q61 2SC2750
Q62 2SA1020
Q63 2SA733
R63 56
C70 0.1
R64 100
RF61 ESAC82M-004
R61 22
C61 1000
R62 1K
C62 1200 35V
C63 0.1
H61 RHA11-1
R65 27K
C64 0.033
C65 0.022
C66 0.022
R66 1K
R67 1K
R68 1K
L62 90µH
RT61 10KD-5
R69-1 0.22
R69-2 0.22
R70 1K
R72 270
RV61 500
R73 180
C67 2700 10V
D62 S3V40
R74 0.05
TH61 5P4M
ZD61 HZ6A-3
R75 10
C69 0.01
D63 ERB83-004
C68 10000 63V
R76 1K
L61 1µH
D61 D5S4M
F61 125V 3.15A
RF52 D8LCA20
R52 22
C52 1000p
C58 330 50V
R55 470
RF51 ESAD92M-02
R51 22
C51 1000p
C54 2700 35V
R98 2.2K
D83 IS2075K
D82 IS2075K
C89 0.047
POS51
Q51 2SA733
ZD82 HZ30-1
R97 56K
R96 1K
R93 220
PC22-2 PC111LS
C59 330 50V
R54 560
C56 2700 35V
C57 2700 35V
R81 220
R83 8.2K
RV81 1K
M82 TA75358S
R86 56K
R85 3.9K
PC21-2 PC111LS
C81 1 50V
R84 220
M81 AN1431T
R82 1K
C84 470p
C82 47 35V
C83 0.047
R87 2.7K
D81 IS2075K
R90 27K
R88 1.8K
ZD81 HZ5C-1
R89 1.2K
RV83 2K
R95 5.6K
R99 560
D84 ERA82-004
C85 33 35V
-B
+B
R94 1K
CN1
+5V 1
+5V 2
GND 3
GND 4
+12V 5
GND 6
-12V 7
GND 8
TO SY-9 BOARD CN1
CN12
+12V 1
+12V 2
+12V 3
+24V . M 4
+24V . M 5
GND .M 6
GND 7
GND 8
V. CONT 9
GND 10
TO SY-9 BOARD CN2
CN2
+5V 1
+5V 2
+5V 3
+5V 4
+5V 5
GND 6
GND 7
GND 8
GND 9
GND 10
+12V 11
GND 12
GND 13
-12V 14
TO FMY-8 BOARD CN2
CN4
+12V 1
+12V 2
GND 3
GND 4
-12V 5
+5V 6
+5V 7
GND 8
GND 9
TO VA-26 BOARD CN503
CN6
+12V 1
NC 2
GND 3
M
M905 FAN MOTOR
CN5
-B SENS 1
GND . M 2
GND . M 3
GND . M 4
GND . M 5
GND . M 6
GND . M 7
GND . M 8
+24V M 9
+24V M 10
+24V M 11
+24V M 12
+24V M 13
+24V M 14
+24V M 15
+B SENS 16
TO THERMAL HEAD

VTR-P3A (POWER SUPPLY)


PRIMARY
SECONDARY
4U
CN10
L
N
P-906082 A
NK-81V-0
VTR-
P3A
P3E
R1
J1
C9
C5
L1
C1
C2
C7
L4
C8
C4-2
C4-1
L7
RF11
R11
C13
R13
TH11
D16
C16
R16-1
R16-2
C28-2
C28-1
C11
R18
R15
R17
Q11
C17-1
C17-2
R12
D11
R21-1
R21-2
D21
R22
T11
C23
PC21
PC22
R23
C22
R24
C25
H21
C26
C24
RV21
J32
J2
C21
C27
C58
RF52
R52
C52
J3
J4
J5
J6
R81
R82
R84
R85
R86
C82
R87
J8
R75
ZD61
R76
C69
J22
C81
C84
C83
RV81
R90
C85
R83
R89
R88
RV83
ZD81
D62
R74
TH61
D83
C95
D42
C42
RF61
C61
R61
R69-2
R69
J19
J20
C67
R98
Q61
R63
Q62
C70
R64
L62
D61
R62
R61
R66
C65
C64
RV61
R68
R67
C62
H61
C63
C66
R93
ZD82
R96
Q51
C89
RF41
L61
R50
C96
C43
D41
J10
J11
J12
J13
J14
J15
J16
RF51
C51
R51
T11
C94
R48
C41
C54
R55
R97
J9
R54
C56
POS51
M42
J21
C46
M41
C45
C92
C91
M43
C47
C93
J31
R49
R94
+B
-B
J26
C68
D82
CN2
CN1
R99
J28
D84
R95
J25
D63
CN4
J33
J27
C49
R46
C48
R45
D81
CN12
J24
J29
J30
CN6
C50
R47
C59
R91
CN5
J23
R92
C57

P-906082A –SOLDERING SIDE–

9-901-930-01

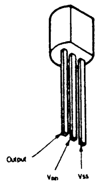

4U
CN7
AC IN
L
N
250Vac T4A
J1
F1
P-906082 B
NK-81V-0
L
N
SWITCH
CN9
250Vac T4A
F2

P-906082B –SOLDERING SIDE–

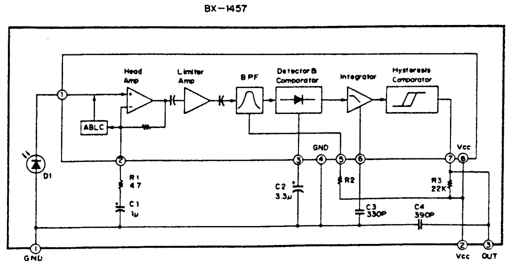
9-902-093-01

4-3. SEMICONDUCTORS

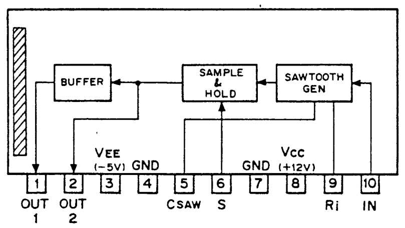
AM27C010-155DC
AM27C512-205DC


Output
VDD
VSS

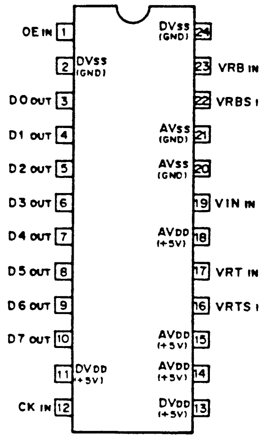
BX-1457 (SONY)

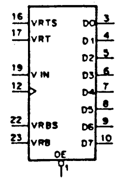

BX-1457
Head Amp
Limiter Amp
BPF
Detector& Comparator
Integrator
Hysteresis Comparator
ABLC
D1
R1 47
C1 1μ
C2 3.3μ
R2
C3 330P
R3 22K
C4 390P
GND
Vcc
OUT

BX1461 (SONY)
PHASE DETECTOR
— PRINTED SIDE —


BUFFER
SAMPLE & HOLD
SAWTOOTH GEN
VEE (-5V) GND
GND
Vcc (+12V)
1 2 3 4 5 6 7 8 9 10
OUT 1
OUT 2
CSAW
S
Ri
IN

CXD1175AM (SONY) FLAT PACKAGE
C-MOS 8-BIT 20MSPS VIDEO A/D CONVERTER
– TOP VIEW –

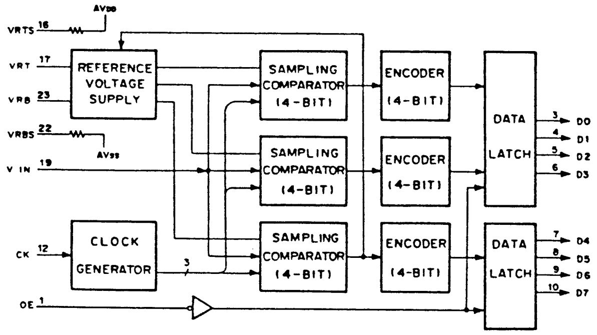

OE IN 1
DVSS (GND) 2
D0 OUT 3
D1 OUT 4
D2 OUT 5
D3 OUT 6
D4 OUT 7
D5 OUT 8
D6 OUT 9
D7 OUT 10
DVDD (+5V) 11
CK IN 12
DVSS (GND) 24
VRB IN 23
VRBS IN 22
AVSS (GND) 21
AVSS (GND) 20
VIN IN 19
AVDD (+5V) 18
VRT IN 17
VRTS IN 16
AVDD (+5V) 15
AVDD (+5V) 14
DVDD (+5V) 13


16 VRTS
17 VRT
19 VIN
12
22 VRBS
23 VRB
D0 3
D1 4
D2 5
D3 6
D4 7
D5 8
D6 9
D7 10
OE 1

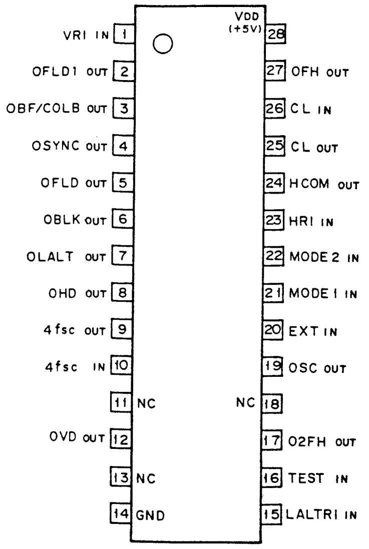
AV_{DD} : ANALOG POWER SUPPLY
AV_{SS} : ANALOG GROUND
CK : CLOCK INPUT
D0 – 7 : DIGITAL DATA OUTPUTS (LSB to MSB)
DV_{DD} : DIGITAL POWER SUPPLY
DV_{SS} : DIGITAL GROUND
OE : OUTPUT ENABLE
(OE = HIGH : HIGH IMPEDANCE)
VIN : ANALOG VOLTAGE INPUT
VRB : BOTTOM REFERENCE VOLTAGE INPUT
VRBS : AS SHORT-CIRCUIT AT VRB. GENERATES + 0.6V
VRT : TOP REFERENCE VOLTAGE INPUT
VRTS : AS SHORT-CIRCUIT AT VRT. GENERATES + 2.6V

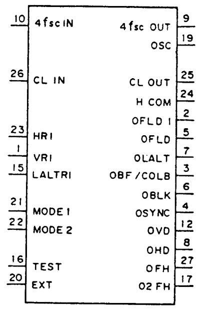
STEP	INPUT SIGNAL VOLTAGE	DATA OUTPUTS							
		D7	D6	D5	D4	D3	D2	D1	D0
0	0V (VRT)	1	1	1	1	1	1	1	1
1	0.01V	1	1	1	1	1	1	1	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
127	1.34V	1	0	0	0	0	0	0	0
128	1.35V	0	1	1	1	1	1	1	1
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
255	2.7V (VRB)	0	0	0	0	0	0	0	0

0 : LOW LEVEL
1 : HIGH LEVEL


AVDD
VRTS 16
VRT 17
VRB 23
VRBS 22
AVSS
V IN 19
CK 12
OE 1
REFERENCE VOLTAGE SUPPLY
SAMPLING COMPARATOR (4-BIT)
SAMPLING COMPARATOR (4-BIT)
SAMPLING COMPARATOR (4-BIT)
ENCODER (4-BIT)
ENCODER (4-BIT)
ENCODER (4-BIT)
CLOCK GENERATOR
DATA LATCH
DATA LATCH
3 D0
4 D1
5 D2
6 D3
7 D4
8 D5
9 D6
10 D7

CXD1217M (SONY) FLAT PACKAGE
C-MOS SYNC GENERATOR
– TOP VIEW –

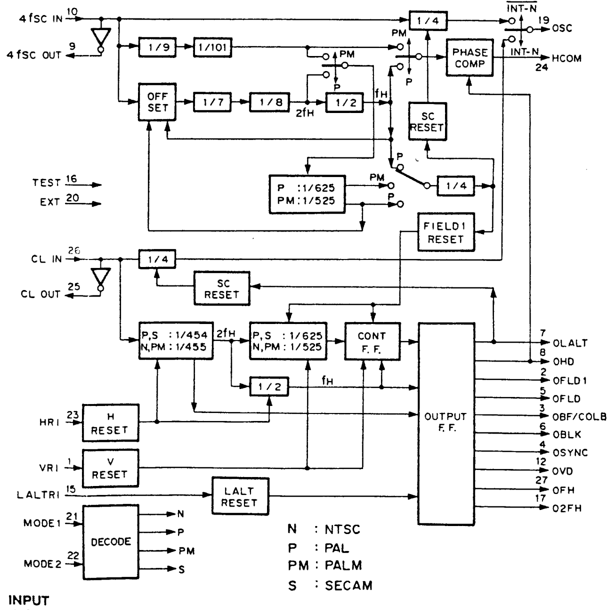

VRI IN 1
OFLD1 OUT 2
OBF/COLB OUT 3
OSYNC OUT 4
OFLD OUT 5
OBLK OUT 6
OLALT OUT 7
OHD OUT 8
4fsc OUT 9
4fsc IN 10
11 NC
OVD OUT 12
13 NC
14 GND
VDD (+5V) 28
27 OFH OUT
26 CL IN
25 CL OUT
24 HCOM OUT
23 HRI IN
22 MODE 2 IN
21 MODE 1 IN
20 EXT IN
19 OSC OUT
NC 18
17 O2FH OUT
16 TEST IN
15 LALTRI IN


10 4fsc IN
26 CL IN
23 HRI
1 VRI
15 LALTRI
21 MODE 1
22 MODE 2
16 TEST
20 EXT
4fsc OUT 9
OSC 19
CL OUT 25
H COM 24
OFLD 1 2
OFLD 5
OLALT 7
OBF/COLB 3
OBLK 6
OSYNC 4
OVD 12
OHD 8
OFH 27
O2 FH 17

SYSTEM	4fsc	CLOCK
NTSC	910fH	910fH
PAL	1135fH+2fV	908fH
PALM	909fH	910fH
SECAM	—	908fH

INPUT		SYSTEM
MODE1	MODE2	
0	0	NTSC
0	1	SECAM
1	0	PALM
1	1	PAL

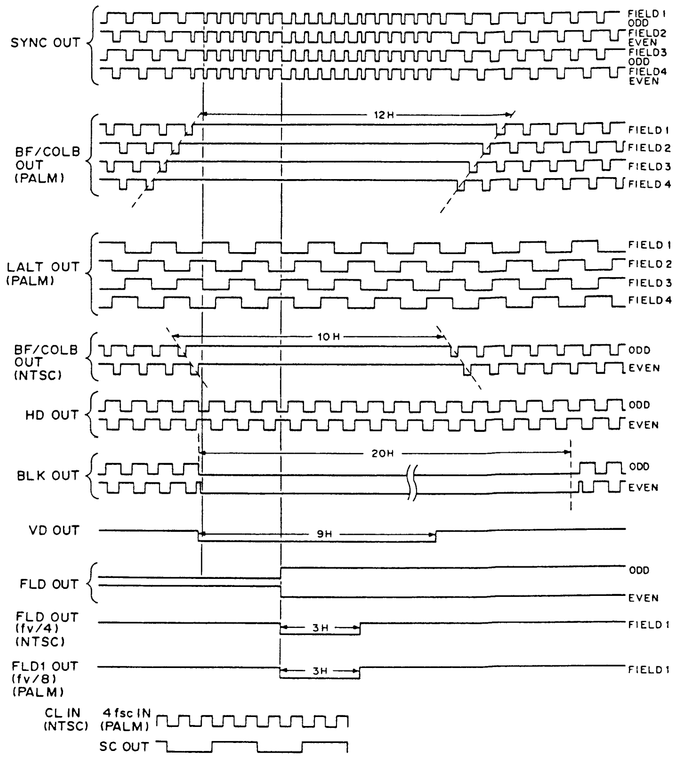
0 ; LOW LEVEL
1 ; HIGH LEVEL


4fsc IN 10
4fsc OUT 9
1/9
1/101
1/4
PM
P
INT-N
19 OSC
PHASE COMP
HCOM 24
OFF SET
1/7
1/8
2fH
1/2
fH
SC RESET
TEST 16
EXT 20
P :1/625
PM :1/525
FIELD1 RESET
CL IN 26
CL OUT 25
1/4
SC RESET
P,S :1/454
N,PM :1/455
P,S :1/625
N,PM :1/525
CONT F.F.
1/2
OUTPUT F.F.
HRI 23
H RESET
VRI 1
V RESET
LALTRI 15
LALT RESET
MODE1 21
MODE2 22
DECODE
N
P
PM
S
7 OLALT
8 OHD
2 OFLD1
5 OFLD
3 OBF/COLB
6 OBLK
4 OSYNC
12 OVD
27 OFH
17 O2FH
N : NTSC
P : PAL
PM : PALM
S : SECAM

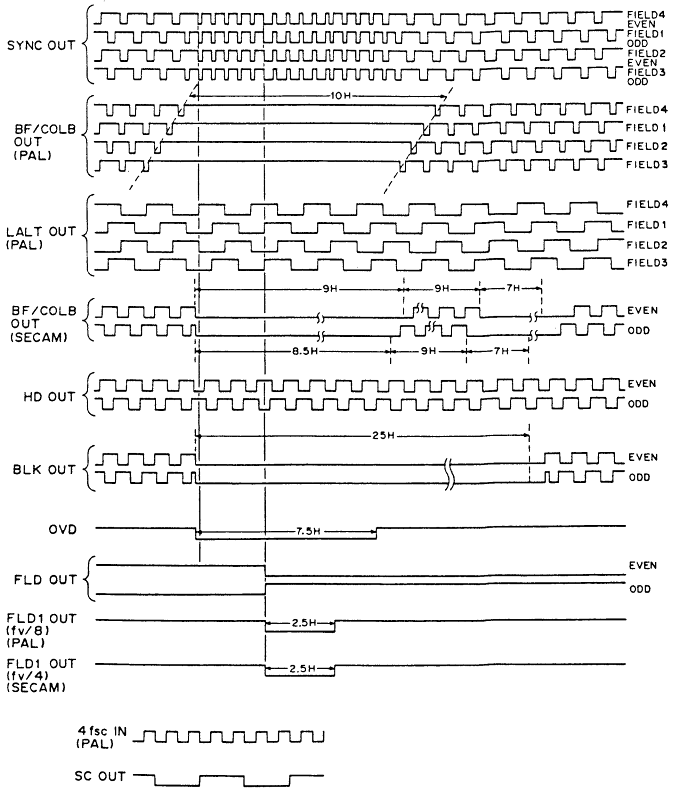
INPUT
4fSC IN ; 4fSC INPUT
CL IN ; CLOCK INPUT
EXT ; SYNC MODE SELECT
(L ; INTERNAL/H ; EXTERNAL)
HRI ; H RESET
LALTRI ; LINE CHANGE RESET
MODE 1,2 ; SYSTEM SELECT
VRI ; V RESET

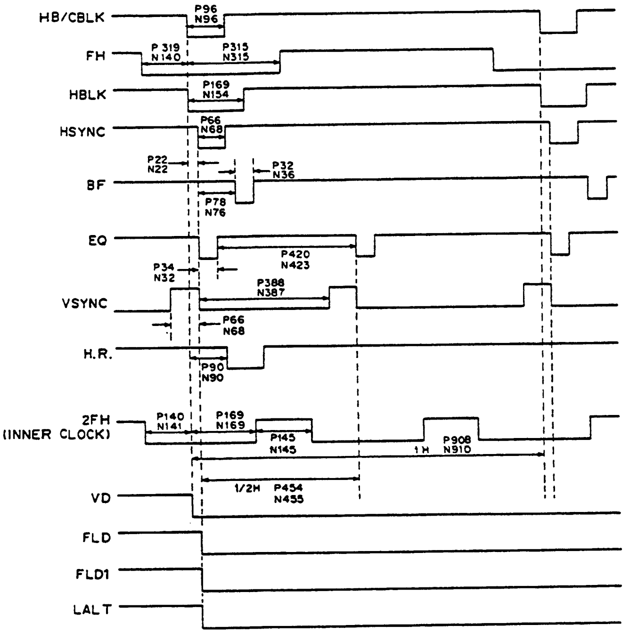
OUT PUT
4fSC OUT ; 4fSC OUTPUT
CL OUT ; CLOCK OUTPUT
HCOM ; PHASE COMPARATOR
O2fH ; 2fH OUTPUT
OBF/COLB ; BURST FLAG/COLOR BLANKING
OBLK ; COMPOSITE BLANKING
OFH ; H FREQUENCE
OFLD ; EVEN, ODD
OFLD1 ; FIELD1
OHD ; H DRIVE
OLALT ; LINE CHANGE
OSC ; SUBCARRIER
OSYNC ; COMPOSITE SYNC
OVD ; V DRIVE

(NTSC, PALM)


SYNC OUT
FIELD1 ODD
FIELD2 EVEN
FIELD3 ODD
FIELD4 EVEN
12H
BF/COLB OUT (PALM)
FIELD1
FIELD2
FIELD3
FIELD4
LALT OUT (PALM)
FIELD1
FIELD2
FIELD3
FIELD4
BF/COLB OUT (NTSC)
10H
ODD
EVEN
HD OUT
ODD
EVEN
BLK OUT
20H
ODD
EVEN
VD OUT
9H
FLD OUT
ODD
EVEN
FLD OUT (fv/4) (NTSC)
3H
FIELD1
FLD1 OUT (fv/8) (PALM)
3H
FIELD1
CL IN (NTSC)
4fsc IN (PALM)
SC OUT

(PAL, SECAM)

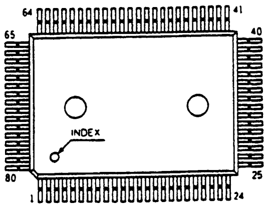

SYNC OUT
FIELD4 EVEN
FIELD1 ODD
FIELD2 EVEN
FIELD3 ODD
10H
BF/COLB OUT (PAL)
FIELD4
FIELD1
FIELD2
FIELD3
LALT OUT (PAL)
FIELD4
FIELD1
FIELD2
FIELD3
BF/COLB OUT (SECAM)
9H
9H
7H
8.5H
9H
7H
EVEN
ODD
HD OUT
EVEN
ODD
BLK OUT
25H
EVEN
ODD
OVD
7.5H
FLD OUT
EVEN
ODD
FLD1 OUT (fv/8) (PAL)
2.5H
FLD1 OUT (fv/4) (SECAM)
2.5H
4fsc IN (PAL)
SC OUT


HB/CBLK
P96
N96
FH
P 319
N140
P315
N315
HBLK
P169
N154
HSYNC
P66
N68
P22
N22
P32
N36
BF
P78
N76
EQ
P420
N423
P34
N32
P388
N387
VSYNC
P66
N68
H.R.
P90
N90
2FH
(INNER CLOCK)
P140
N141
P169
N169
P145
N145
1H
P908
N910
1/2H
P454
N455
VD
FLD
FLD1
LALT

P: PAL, SECAM
N: NTSC, PALM

CXD8301Q (SONY)

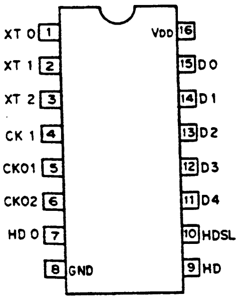
C-MOS GATE ARRAY (VIDEO PRINTER)
— TOP VIEW —

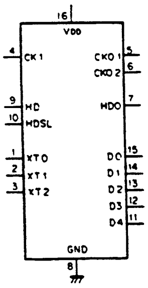

64
41
65
40
INDEX
80
25
1
24

MARKING SIDE VIEW

No.	Name	No.	Name	No.	Name	No.	Name
1	COLB	21	VDD	41	SEL2	61	GND
2	VDD	22	GND	42	G0	62	OB0
3	GND	23	INC0	43	G1	63	OB1
4	INA0	24	INC1	44	BA	64	OB2
5	INA1	25	INC2	45	WR	65	OB3
6	INA2	26	INC3	46	CS	66	OB4
7	INA3	27	INC4	47	N.C	67	OB5
8	INA4	28	INC5	48	N.C	68	OB6
9	INA5	29	INC6	49	VDD	69	OB7
10	INA6	30	INC7	50	GND	70	OC0
11	INA7	31	GND	51	OA0	71	GND
12	GND	32	CLK2	52	OA1	72	VDD
13	INB0	33	GND	53	GND	73	OC1
14	INB1	34	VDD	54	OA2	74	OC2
15	INB2	35	CLK1	55	OA3	75	OC3
16	INB3	36	A0	56	OA4	76	OC4
17	INB4	37	A1	57	OA5	77	OC5
18	INB5	38	N.C	58	OA6	78	OC6
19	INB6	39	SEL0	59	OA7	79	OC7
20	INB7	40	SEL1	60	N.C	80	COLA

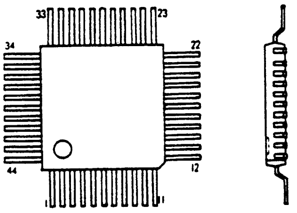
CXD1332P (SONY)
C-MOS
— TOP VIEW —


XT 0 1
XT 1 2
XT 2 3
CK 1 4
CKO1 5
CKO2 6
HD 0 7
8 GND
VDD 16
15 D0
14 D1
13 D2
12 D3
11 D4
10 HDSL
9 HD

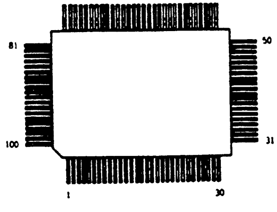

16
VDD
4 CK1
CKO1 5
CKO2 6
9 HD
10 HDSL
HDO 7
1 XT0
2 XT1
3 XT2
D0 15
D1 14
D2 13
D3 12
D4 11
GND
8

CK1 ; COUNTER CLOCK INPUT
CKO1, O2; EXTERNAL COUNTER
; CLOCK OUTPUTS
D0∼D4 ; DATA BUS INPUTS/OUTPUTS
HD ; HD INPUT
HDO ; HD OUTPUT
HDSL ; HD SELECT
XT0∼XT2; XTAL INPUTS/OUTPUTS

CXD8327Q (SONY)

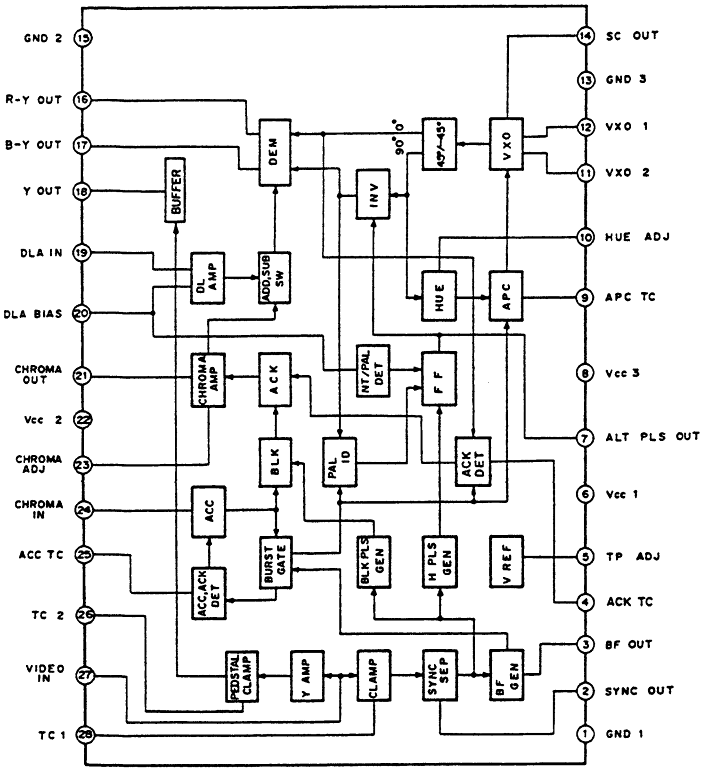

33
23
34
22
44
12
1
11

CXD8328Q (SONY)
uPD65013GF-407-3BA (NEC)


80
51
81
50
100
31
1
30

CXA1228S (SONY)

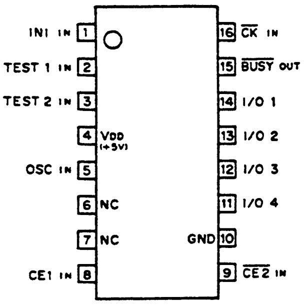
C-MOS NTSC/PAL DECODER

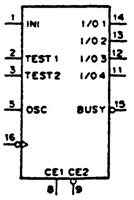

GND 2 15
R-Y OUT 16
B-Y OUT 17
Y OUT 18
DLA IN 19
DLA BIAS 20
CHROMA OUT 21
Vcc 2 22
CHROMA ADJ 23
CHROMA IN 24
ACC TC 25
TC 2 26
VIDEO IN 27
TC 1 28
14 SC OUT
13 GND 3
12 VXO 1
11 VXO 2
10 HUE ADJ
9 APC TC
8 Vcc 3
7 ALT PLS OUT
6 Vcc 1
5 TP ADJ
4 ACK TC
3 BF OUT
2 SYNC OUT
1 GND 1
BUFFER
DEM
90°
0°
45°/-45°
VXO
INV
DL AMP
ADD,SUB SW
HUE
APC
CHROMA AMP
ACK
NT/PAL DET
FF
BLK
PAL ID
ACK DET
ACC
BURST GATE
BLK PLS GEN
H PLS GEN
V REF
ACC,ACK DET
PEDESTAL CLAMP
Y AMP
CLAMP
SYNC SEP
BF GEN

CXK1005P (SONY)

MNOS 512-BIT (32x16) E²PROM

— TOP VIEW —

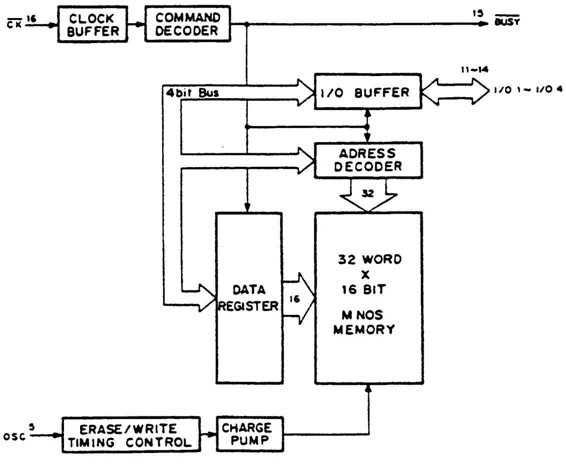

INI IN 1
TEST 1 IN 2
TEST 2 IN 3
4 VDD (+5V)
OSC IN 5
6 NC
7 NC
CE1 IN 8
16 CK IN
15 BUSY OUT
14 I/O 1
13 I/O 2
12 I/O 3
11 I/O 4
GND 10
9 CE2 IN


1 INI
2 TEST1
3 TEST2
5 OSC
16
I/O1 14
I/O2 13
I/O3 12
I/O4 11
BUSY 15
CE1 CE2
8
9

INI: INITIALIZE INPUT
TEST1, TEST2: CONNECTED TO VDD
OSC: OSCILLATOR INPUT
CE1, CE2: CHIP ENABLE INPUT
I/O1-I/O4: ADDRESS/DATA INPUTS/OUTPUTS
BUSY: BUSY SIGNAL OUTPUT
CK: PROCESSOR CLOCK INPUT

INPUT							FUNCTION
INI	CE	$\overline{CE}$	I/O1	I/O2	I/O3	I/O4	
0	1	0	0	0	1	0	READ
0	1	0	1	0	1	0	WRITE
0	1	0	X	X	0	0	NO OPERATION
0	1	0	X	X	0	1	NO OPERATION
0	1	0	X	X	1	1	NO OPERATION
0	0	0	X	X	X	X	NO OPERATION
0	0	1	X	X	X	X	NO OPERATION
0	1	1	X	X	X	X	NO OPERATION
1	X	X	X	X	X	X	NO OPERATION

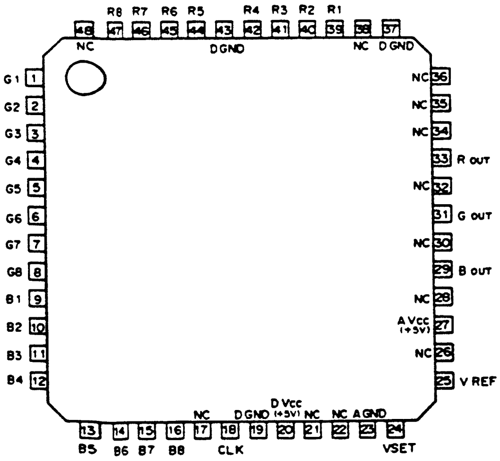
1: HIGH LEVEL
0: LOW LEVEL
X: DON'T CARE

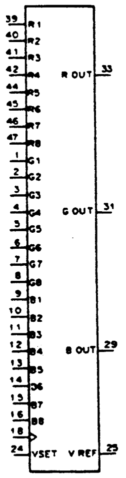

CK 16
CLOCK BUFFER
COMMAND DECODER
15 BUSY
11~14
4bit Bus
I/O BUFFER
I/O 1~I/O 4
ADRESS DECODER
32
DATA REGISTER
16
32 WORD x 16 BIT
M NOS MEMORY
OSC 5
ERASE/WRITE TIMING CONTROL
CHARGE PUMP

CXA12600-Z (SONY) FLAT PACKAGE

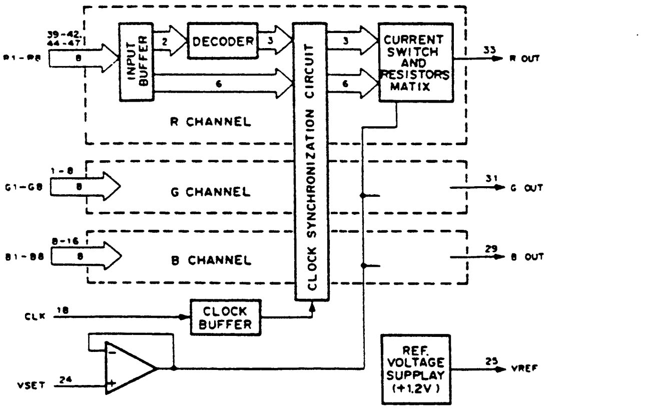
8-BIT 35MHz 3-CHANNEL D/A CONVERTER

- TOP VIEW -

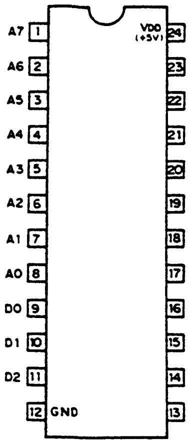

R8 R7 R6 R5 R4 R3 R2 R1
48 47 46 45 44 43 42 41 40 39 38 37
NC
DGND
NC DGND
G1 1
G2 2
G3 3
G4 4
G5 5
G6 6
G7 7
G8 8
B1 9
B2 10
B3 11
B4 12
NC 36
NC 35
NC 34
33 R OUT
NC 32
31 G OUT
NC 30
29 B OUT
NC 28
AVcc (+5V) 27
NC 26
25 V REF
13 14 15 16 17 18 19 20 21 22 23 24
B5 B6 B7 B8
NC
CLK
DGND
D Vcc (+5V)
NC
NC AGND
VSET


39 R1
40 R2
41 R3
42 R4
44 R5
45 R6
46 R7
47 R8
1 G1
2 G2
3 G3
4 G4
5 G5
6 G6
7 G7
8 G8
9 B1
10 B2
11 B3
12 B4
13 B5
14 B6
15 B7
16 B8
18
24 VSET
R OUT 33
G OUT 31
B OUT 29
VREF 25

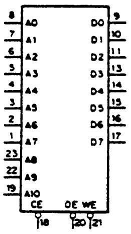
B1-B8 : B CHANNEL DIGITAL INPUTS (LSB TO MSB)
B OUT : B CHANNEL ANALOG OUTPUT
CLK : D/A CONVERSION CLOCK
G1-G8 : G CHANNEL DIGITAL INPUTS (LSB TO MSB)
G OUT : G CHANNEL ANALOG OUTPUT
R1-R8 : R CHANNEL DIGITAL INPUTS (LSB TO MSB)
R OUT : R CHANNEL ANALOG OUTPUT
VREF : REFERENCE VOLTAGE OUTPUT, +1.2V TYP.
VSET : BIAS INPUT (VSET = +0.87V ; D/A OUT = 1Vp-p)


R1-R8
39-42, 44-47
8
INPUT BUFFER
2
DECODER
3
6
CURRENT SWITCH AND RESISTORS MATIX
33 R OUT
R CHANNEL
CLOCK SYNCHRONIZATION CIRCUIT
G1-G8
1-8
G CHANNEL
31 G OUT
B1-B8
8-16
B CHANNEL
29 B OUT
CLK 18
CLOCK BUFFER
VSET 24
REF. VOLTAGE SUPPLAY (+1.2V)
25 VREF

CXK5814P-35L (SONY) (ACCESS TIME = 35nS)
C-MOS 16K (2Kx8) STATIC RAM
- TOP VIEW -

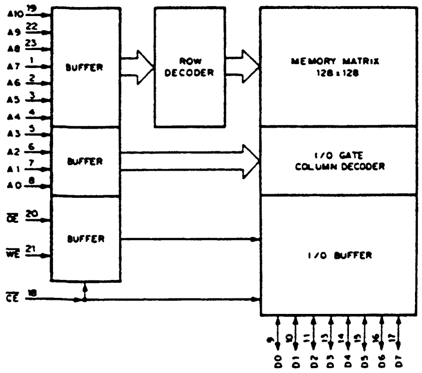


VDD (+5V)
A7 1
A6 2
A5 3
A4 4
A3 5
A2 6
A1 7
A0 8
D0 9
D1 10
D2 11
12 GND
24
23 A8
22 A9
21 WE
20 OE
19 A10
18 CE
17 D7
16 D6
15 D5
14 D4
13 D3



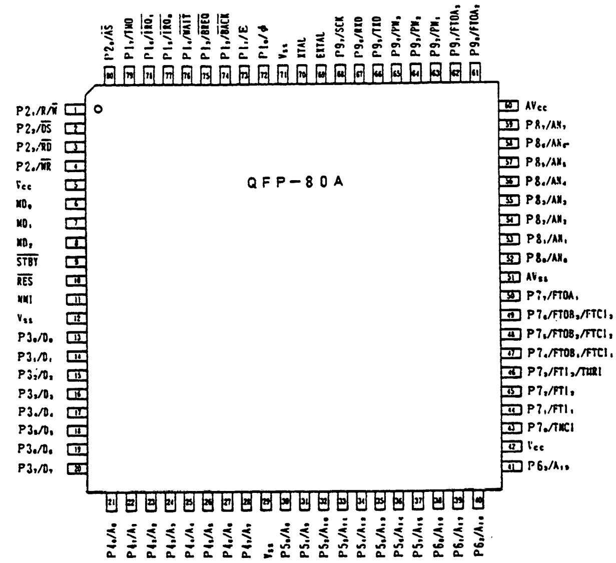
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
CE
OE WE
D0
D1
D2
D3
D4
D5
D6
D7

A0 ~ A10 ; ADDRESS INPUTS
D0 ~ D7 ; DATA INPUTS/OUTPUTS
CE ; CHIP ENABLE INPUT
OE ; OUTPUT ENABLE INPUT
WE ; WRITE ENABLE INPUT

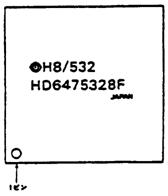


A10
A9
A8
A7
A6
A5
A4
A3
A2
A1
A0
OE
WE
CE
BUFFER
BUFFER
BUFFER
ROW DECODER
MEMORY MATRIX 128 x 128
I/O GATE COLUMN DECODER
I/O BUFFER
D0
D1
D2
D3
D4
D5
D6
D7

HD6435328RB13F (HITACHI)



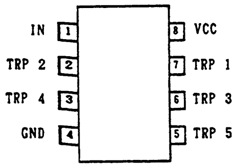
QFP-80A
P2./AS
P1./TMO
P1./IRQ
P1./IRQ
P1./WAIT
P1./BREQ
P1./BACK
P1./E
P1./φ
Vss
XTAL
EXTAL
P9./SCK
P9./RXD
P9./TXD
P9./PW
P9./PW
P9./PW
P9./FTOA
P9./FTOA
P2./R/W
P2./DS
P2./RD
P2./WR
Vcc
MD0
MD1
MD2
STBY
RES
NMI
Vss
P3./D.
P3./D.
P3./D.
P3./D.
P3./D.
P3./D.
P3./D.
P3./D.
P4./A.
P4./A.
P4./A.
P4./A.
P4./A.
P4./A.
P4./A.
P4./A.
Vss
P5./A.
P5./A.
P5./A.
P5./A.
P5./A.
P5./A.
P5./A.
P5./A.
P6./A.
P6./A.
P6./A.
AVcc
P8./AN.
P8./AN.
P8./AN.
P8./AN.
P8./AN.
P8./AN.
P8./AN.
P8./AN.
AVss
P7./FTOA.
P7./FTOB./FTCI.
P7./FTOB./FTCI.
P7./FTOB./FTCI.
P7./FTI./TMRI
P7./FTI.
P7./FTI.
P7./TMCI
Vcc
P6./A.



H8/532
HD6475328F
JAPAN

DS1000M-75(DALLAS SEMICONDUCTOR)
C-MOS DELAY LINE

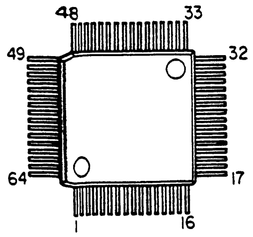
— TOP VIEW —



IN 1
TRP 2 2
TRP 4 3
GND 4
8 VCC
7 TRP 1
6 TRP 3
5 TRP 5

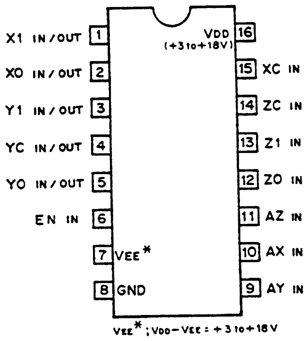
H8/325KY (HITACHI)

C-MOS 8-BIT SINGLE CHIP MICROCOMPUTER
(ROM 32 KByte RAM 1 KByte)
- TOP VIEW -

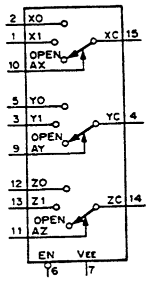


48
33
49
32
64
17
1
16

HD14053BFP (HITACHI) FLAT PACKAGE
C-MOS TRIPLE 2-CHANNEL ANALOG MULTIPLEXER/DEMULTIPLEXER
- TOP VIEW - CD4053BE



X1 IN/OUT 1
X0 IN/OUT 2
Y1 IN/OUT 3
YC IN/OUT 4
Y0 IN/OUT 5
EN IN 6
7 VEE*
8 GND
VDD (+3 to +18V) 16
15 XC IN/OUT
14 ZC IN/OUT
13 Z1 IN/OUT
12 Z0 IN/OUT
11 AZ IN/OUT
10 AX IN/OUT
9 AY IN/OUT
VEE* ; VDD−VEE = +3 to +18 V

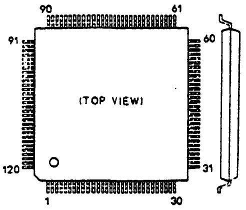


2 X0
1 X1
10 AX
OPEN
XC 15
5 Y0
3 Y1
9 AY
OPEN
YC 4
12 Z0
13 Z1
11 AZ
OPEN
ZC 14
EN 6
VEE 7

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE.

CONT. INPUTS		ON CHANNEL
EN	A (X,Y,Z,)	
0	0	0
0	1	1
1	X	OPEN

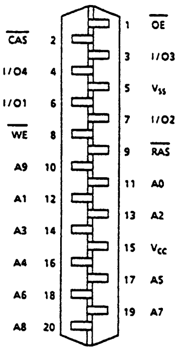
HDC443V2 (HITACHI)
– TOP VIEW –


90
61
91
60
(TOP VIEW)
120
31
1
30

No.	I/O	Name	No.	I/O	Name	No.	I/O	Name	No.	I/O	Name
1	-	VDD	31	-	GND	61	-	VDD	91	-	GND
2	O	DTT0	32	O	DTE	62	I/O	DAA	92	I	WR
3	O	DTT1	33	I	DCK	63	I/O	DA9	93	I	DDD0
4	O	DTT2	34	I	TMGP	64	I/O	DA8	94	I	DDD1
5	O	DTT3	35	I	PRIN	65	O	CHOO	95	I	DDD2
6	O	DTT4	36	I	PRNS	66	O	AFOO	96	I	DDD3
7	O	DTT5	37	I	RESE	67	O	AAAB	97	I	DDD4
8	O	DTT6	38	I	LI7	68	O	ABBB	98	I	DDD5
9	O	DTT7	39	I	LI6	69	I	TSA	99	I	DDD6
10	O	DTT8	40	I	LI5	70	I	TSB	100	I	DDD7
11	O	DTT9	41	I	LI4	71	I	RWA	101	I	A0A
12	O	DTTA	42	I	LI3	72	I	RWB	102	I	A1A
13	I	TI07	43	I	LI2	73	I	RWC	103	I	A2A
14	O	TO04	44	I	LI1	74	I	LG	104	I	A3A
15	-	GND	45	I	LI0	75	-	GND	105	I	CS2
16	O	HDC	46	I/O	DA7	76	I/O	AD0	106	I	CS1
17	O	ST0B	47	I/O	DA6	77	I/O	AD1	107	I	CS0
18	O	DATA	48	I/O	DA5	78	I/O	AD2	108	O	TO02
19	O	DATB	49	I/O	DA4	79	I/O	AD3	109	I	TI03
20	O	DRV	50	I/O	DA3	80	I/O	AD4	110	I	TI04
21	I	TI08	51	I/O	DA2	81	I/O	AD5	111	O	TO03
22	O	TO05	52	I/O	DA1	82	I/O	AD6	112	I	TI05
23	O	TO01	53	I/O	DA0	83	I/O	AD7	113	I	TI06
24	I	TI01	54	I/O	DAF	84	I/O	AD8	114	I	TSNR
25	I	TI02	55	I/O	DAE	85	I/O	AD9	115	I	TWEB
26	O	TO06	56	I/O	DAD	86	I/O	ADA	116	I	TTOE
27	I	TI10	57	I/O	DAC	87	O	OPTW	117	I	TTCS
28	I	TI11	58	I/O	DAB	88	O	OPTO	118	I	CLOK
29	I	TI09	59	I	IOEN	89	I	0LD	119	O	OSO
30	-	VDD	60	-	GND	90	-	VDD	120	-	GND

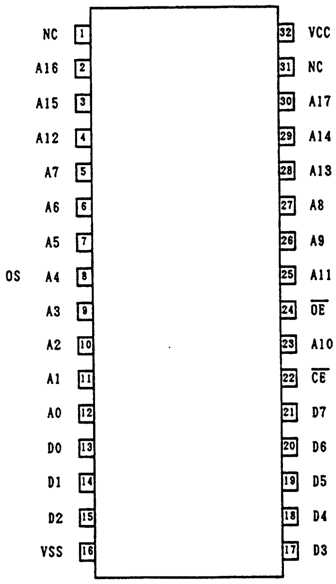
HM51H240AZP-8 (HITACHI)

C-MOS RAMDOM ACCESS MEMORY


1 $\overline{\text{OE}}$
$\overline{\text{CAS}}$ 2
3 I/O3
I/O4 4
5 V_{ss}
I/O1 6
7 I/O2
$\overline{\text{WE}}$ 8
9 $\overline{\text{RAS}}$
A9 10
11 A0
A1 12
13 A2
A3 14
15 V_{cc}
A4 16
17 A5
A6 18
19 A7
A8 20

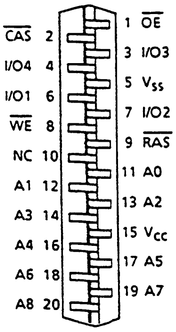
HN62302BF-*** (HITACHI)
C-MOS 262144×8-bit MASK PROGRAMMABLE READ ONLY MEMORY

— TOP VIEW —


NC 1
A16 2
A15 3
A12 4
A7 5
A6 6
A5 7
OS
A4 8
A3 9
A2 10
A1 11
A0 12
D0 13
D1 14
D2 15
VSS 16
32 VCC
31 NC
30 A17
29 A14
28 A13
27 A8
26 A9
25 A11
24 $\overline{\text{OE}}$
23 A10
22 $\overline{\text{CE}}$
21 D7
20 D6
19 D5
18 D4
17 D3

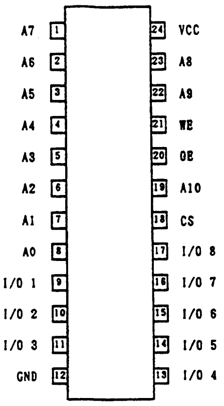
HM514256AZP-8 (HITACHI)

C-MOS RAMDOM ACCESS MEMORY

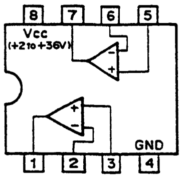

1 $\overline{\text{OE}}$
$\overline{\text{CAS}}$ 2
3 I/O3
I/O4 4
5 V_{SS}
I/O1 6
7 I/O2
$\overline{\text{WE}}$ 8
9 $\overline{\text{RAS}}$
NC 10
11 A0
A1 12
13 A2
A3 14
15 V_{CC}
A4 16
17 A5
A6 18
19 A7
A8 20

IDT6116SA35TP(IDT)
C-MOS 2K×8 BIT STATIC RANDOM ACCESS MEMORY

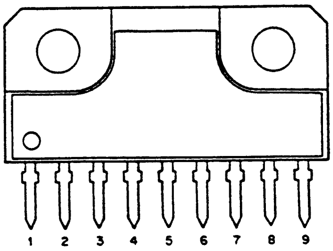
— TOP VIEW —

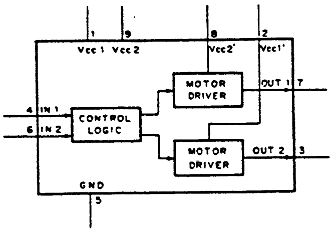

A7 1
A6 2
A5 3
A4 4
A3 5
A2 6
A1 7
A0 8
I/O 1 9
I/O 2 10
I/O 3 11
GND 12
24 VCC
23 A8
22 A9
21 WE
20 OE
19 A10
18 CS
17 I/O 8
16 I/O 7
15 I/O 6
14 I/O 5
13 I/O 4

LM393PS (TI) FLAT PACKAGE
UPC393G2 (NEC) FLAT PACKAGE
DUAL VOLTAGE COMPARATORS
- TOP VIEW -


8
7
6
5
Vcc
(+2 to +36V)
-
+
+
-
GND
1
2
3
4

M54543L (MITSUBISHI)
BI-DIRECTIONAL MOTOR DRIVER
— SIDE VIEW —




1
9
8
2
Vcc 1
Vcc 2
Vcc2'
Vcc1'
MOTOR DRIVER
OUT 1
7
4
IN 1
6
IN 2
CONTROL LOGIC
MOTOR DRIVER
OUT 2
3
GND
5

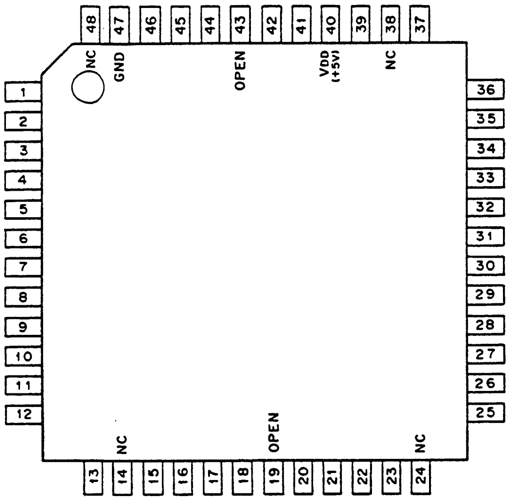
IN		OUT		MODE
1	2	1	2	
0	0	Z	Z	NO OPERATION
1	0	1	0	ROTATION
0	1	0	1	REVERSE ROTATION
1	1	0	0	BRAKE

0 : LOW LEVEL
1 : HIGH LEVEL
Z : HIGH IMPEDANCE

MB89371APF (FUJITSU) FLAT PACKAGE

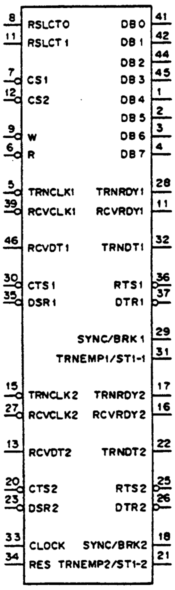
C-MOS DUAL SERIAL DATA TRANSMITTER/RECEIVER UNIT

- TOP VIEW -



NC
GND
OPEN
VDD (+5V)
NC
NC
OPEN
NC
1 2 3 4 5 6 7 8 9 10 11 12
13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32 33 34 35 36
37 38 39 40 41 42 43 44 45 46 47 48

NC : NON CONNECT TERMINAL (OPEN)
OPEN : NEVER CONNECT TERMINAL



8 RSLCT0
11 RSLCT1
7 CS1
12 CS2
9 W
6 R
5 TRNCLK1
39 RCVCLK1
46 RCVDT1
30 CTS1
35 DSR1
15 TRNCLK2
27 RCVCLK2
13 RCVDT2
20 CTS2
23 DSR2
33 CLOCK
34 RES
DB0 41
DB1 42
DB2 44
DB3 45
DB4 1
DB5 2
DB6 3
DB7 4
TRNRDY1 28
RCVRDY1 11
TRNDT1 32
RTS1 36
DTR1 37
SYNC/BRK1 29
TRNEMP1/ST1-1 31
TRNRDY2 17
RCVRDY2 16
TRNDT2 22
RTS2 25
DTR2 26
SYNC/BRK2 18
TRNEMP2/ST1-2 21

INPUT

CLOCK : CLOCK (4.9152MHz) FOR REFERENCE OF TIMING.
CSn : CHIP SELECT OF CHANNELn.(n = 1 OR 2)
CTSn : CLEAR TO SEND OF CHANNELn.(n = 1 OR 2)
DSRn : DATA SET READY OF CHANNELn.(n = 1 OR 2)
R : READ ENABLE
RCVCLKn : RECEIVER CLOCK OF CHANNELn.(n = 1 OR 2)
RCVDTn : RECEIVE DATA OF CHANNELn. (n = 1 OR 2)
RSLCTn : REGISTERS SELECT LINEn.(n = 0 AND 1)
RST : RESET PULSE
TRNCLKn : TRANSMITTER CLOCK OF CHANNELn.(n = 1 OR 2)
W : WRITE ENABLE

OUTPUT

DTRn : DATA TERMINAL READY OF CHANNELn.(n = 1 OR 2)
RCVRDYn : RECEVIER READY OF CHANNELn.(n = 1 OR 2)
RTSn : REQUEST TO SEND OF CHANNELn.(n = 1 OR 2)
TRNDTn : TRANSMIT DATA OF CHANNELn.(n = 1 OR 2)
TRNEMPn/ST1-n : TRANSMITTER EMPTY/BAUD RATE CLOCK OUT OF CHANNELn.(n = 1 OR 2)
TRNRDYn : TRANSMIT READY OF CHANNELn.(n = 1 OR 2)

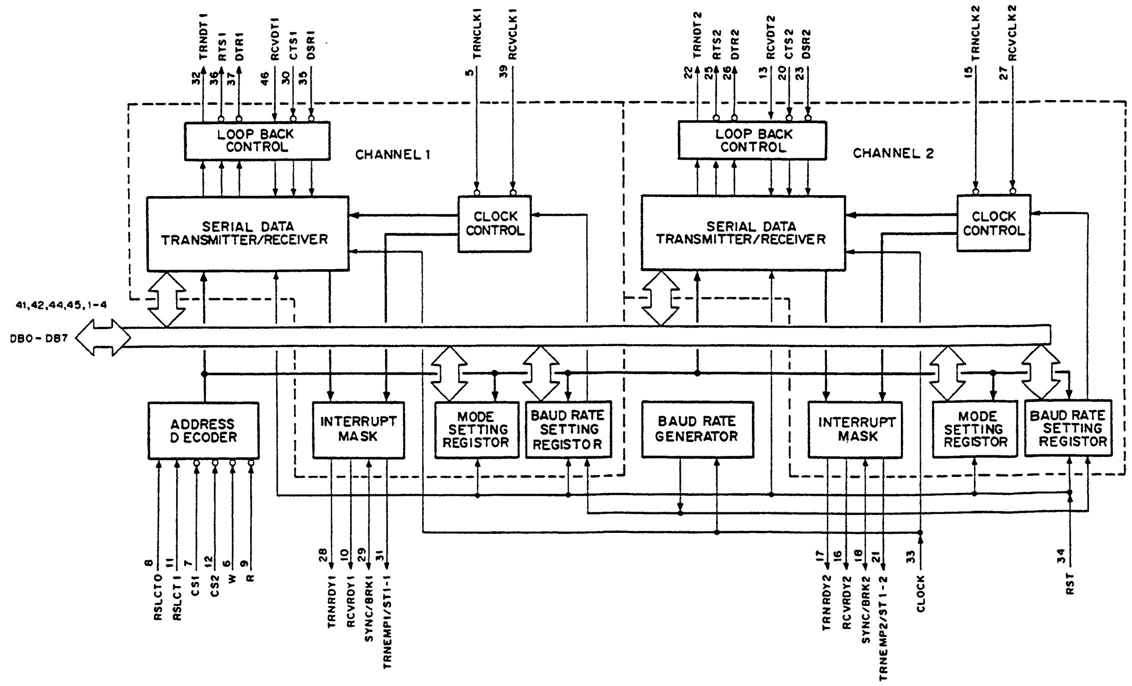
INPUT/OUTPUT

DBn : DATA BUS LINEn.(n = 0 TO 7)
SYNC/BRKn : SYNCHRONIZATION CHARACTOR/BREAK CODE DETECT OF CHANNELn.(n = 1 OR 2)

NC : NON CONNECT TERMINAL (OPEN)
OPEN : NEVER CONNECT TERMINAL

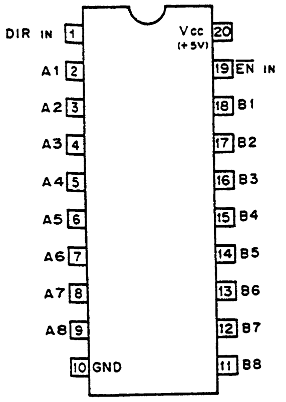
(V_{DD} = + 5V)

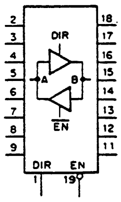
PIN NO.	I/O	SIGNAL	PIN NO.	I/O	SIGNAL	PIN NO.	I/O	SIGNAL
1	I/O	DB4	17	O	TRNRDY2	33	I	CLOCK
2	I/O	DB5	18	I/O	SYNC/BRK2	34	I	RST
3	I/O	DB6	19	–	OPEN	35	I	DSR1
4	I/O	DB7	20	I	CTS2	36	O	RTS1
5	I	TRNCLK1	21	O	TRNEMP2/ST1-2	37	I	DTR1
6	I	W	22	O	TRNDT2	38	–	NC
7	I	CS1	23	O	DSR2	39	I	RCVCLK1
8	I	RSLCT0	24	–	NC	40	–	V_{DD}
9	I	R	25	O	RTS2	41	I/O	DB0
10	O	RCVRDY1	26	O	DTR2	42	I/O	DB1
11	I	RSLCT1	27	I	RCVCLK2	43	–	OPEN
12	I	CS2	28	O	TRNRDY1	44	I/O	DB2
13	I	RCVDT2	29	I/O	SYNC/BRK1	45	I/O	DB3
14	–	NC	30	I	CTS1	46	I	RCVDT1
15	I	TRNCLK2	31	O	TRNEMP1/ST1-1	47	–	GND
16	O	RCVRDY2	32	O	TRNDT1	48	–	NC



32 TRNDT1
36 RTS1
37 DTR1
46 RCVDT1
30 CTS1
35 DSR1
5 TRNCLK1
39 RCVCLK1
22 TRNDT2
25 RTS2
26 DTR2
13 RCVDT2
20 CTS2
23 DSR2
15 TRNCLK2
27 RCVCLK2
LOOP BACK CONTROL
CHANNEL 1
LOOP BACK CONTROL
CHANNEL 2
SERIAL DATA TRANSMITTER/RECEIVER
CLOCK CONTROL
SERIAL DATA TRANSMITTER/RECEIVER
CLOCK CONTROL
41,42,44,45,1-4
DB0 - DB7
ADDRESS DECODER
INTERRUPT MASK
MODE SETTING REGISTOR
BAUD RATE SETTING REGISTOR
BAUD RATE GENERATOR
INTERRUPT MASK
MODE SETTING REGISTOR
BAUD RATE SETTING REGISTOR
8 RSLCT0
11 RSLCT1
7 CS1
12 CS2
6 W
9 R
28 TRNRDY1
10 RCVRDY1
29 SYNC/BRK1
31 TRNEMP1/ST1-1
17 TRNRDY2
16 RCVRDY2
18 SYNC/BRK2
21 TRNEMP2/ST1-2
33 CLOCK
34 RST

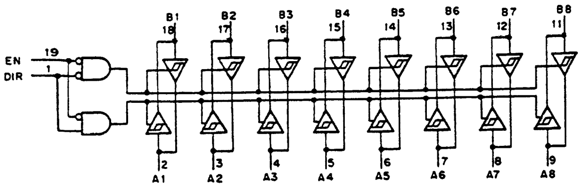
MC74F245M (MOTOROLA) FLAT PACKAGE
TTL BILATERAL SCHMITT TRIGGER BUS TRANSCEIVERS WITH 3-STATE OUTPUTS
– TOP VIEW –


DIR IN 1
A1 2
A2 3
A3 4
A4 5
A5 6
A6 7
A7 8
A8 9
10 GND
Vcc (+5V) 20
19 EN IN
18 B1
17 B2
16 B3
15 B4
14 B5
13 B6
12 B7
11 B8

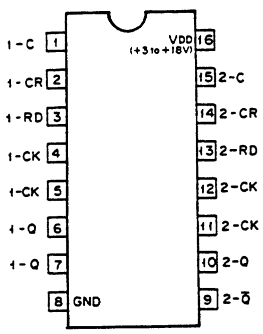

DIR
A
B
EN
DIR EN
1 19

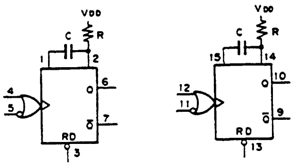
EN	DIR	OPERATION
0	0	B to A
0	1	A to B
1	X	HI - Z

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE


EN 19
DIR 1
B1 18
B2 17
B3 16
B4 15
B5 14
B6 13
B7 12
B8 11
A1 2
A2 3
A3 4
A4 5
A5 6
A6 7
A7 8
A8 9

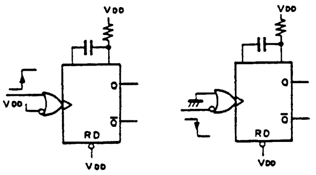
MC14538BF (MOTOROLA) FLAT PACKAGE
C-MOS DUAL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR
– TOP VIEW –


1-C 1
1-CR 2
1-RD 3
1-CK 4
1-CK 5
1-Q 6
1-Q 7
8 GND
VDD (+3 to +18V) 16
15 2-C
14 2-CR
13 2-RD
12 2-CK
11 2-CK
10 2-Q
9 2-Q̄

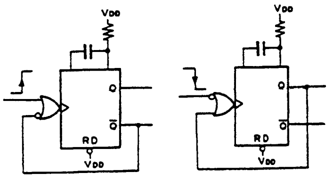

VDD
C R
1 2
4
5
6
7
RD
3
VDD
C R
15 14
12
11
10
9
RD
13

OUTPUT PULSE WIDTH = C·R

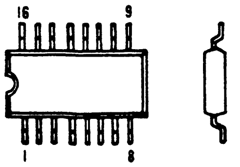
RETRIGGERABLE M.M.V


VDD
VDD
Q
Q̄
RD
VDD
VDD
Q
Q̄
RD
VDD

NON-RETRIGGERABLE M.M.V

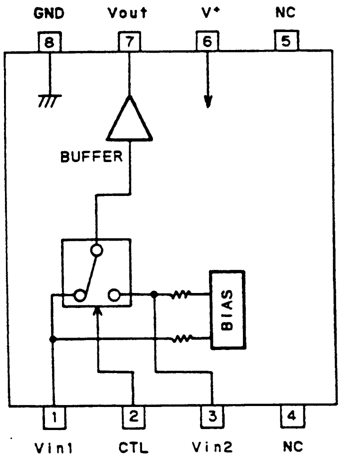

VDD
Q
Q̄
RD
VDD
VDD
Q
Q̄
RD
VDD

MC74F139M-T1 (MOTOROLA)
MC74F257M-T1 (MOTOROLA)



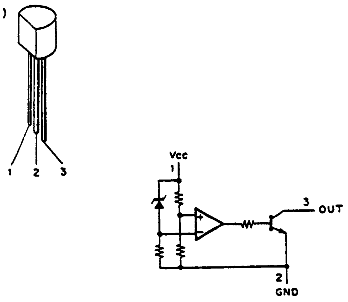
(TOP VIEW)

NJM2233BD


GND
Vout
V+
NC
8
7
6
5
BUFFER
BIAS
1
2
3
4
Vin1
CTL
Vin2
NC

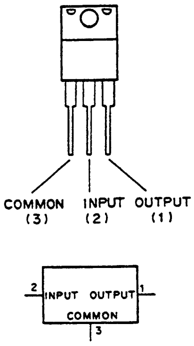
PST523C (MITSUMI) 4.5V
SYSTEM RESETTING DEVICE

(MITSUMI)

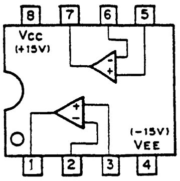

1
2
3
Vcc
1
3
OUT
2
GND

REF.; REFERENCE VOLTAGE

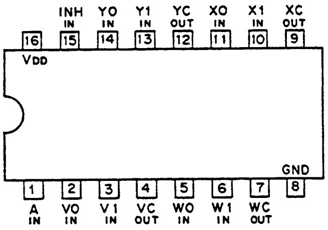
RC7905FA (RAYTHEON) −5V
RC7909FA (RAYTHEON) −9V
NEGATIVE VOLTAGE REGULATOR
– FRONT VIEW –

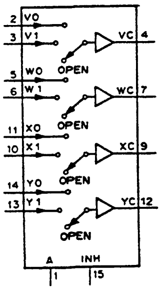

COMMON
(3)
INPUT
(2)
OUTPUT
(1)
2
INPUT
OUTPUT
1
COMMON
3

RC4560M (RAYTHEON) FLAT PACKAGE
DUAL OPERATIONAL AMPLIFIER
– TOP VIEW –


8
7
6
5
Vcc
(+15V)
(−15V)
VEE
1
2
3
4

SN74HC257NS (TI) FLAT PACKAGE
C-MOS 2-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER
– TOP VIEW –


INH IN
Y0 IN
Y1 IN
YC OUT
X0 IN
X1 IN
XC OUT
16
15
14
13
12
11
10
9
VDD
GND
1
2
3
4
5
6
7
8
A IN
V0 IN
V1 IN
VC OUT
W0 IN
W1 IN
WC OUT

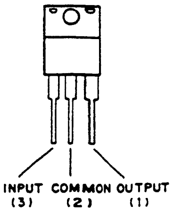

2
V0
3
V1
VC
4
5
W0
OPEN
6
W1
WC
7
11
X0
OPEN
10
X1
XC
9
14
Y0
OPEN
13
Y1
YC
12
OPEN
A
INH
1
15

	CONT. IN		ON CHANNEL
	INH	A	
0; LOW LEVEL	0	0	0
1; HIGH LEVEL	0	1	1
X; DON'T CARE	1	X	OPEN

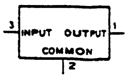
NOTE :

TYPE	VDD
74AC/74HC	+2 to +6V
74ACT	+5V
TC74AC257F	+2 to +5.5V

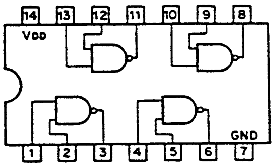
RC7809FA (RAYTHEON)
POSITIVE VOLTAGE REGULATOR
– FRONT VIEW –

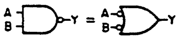

INPUT
(3)
COMMON
(2)
OUTPUT
(1)

OUTPUT VOLTAGE	NJM78M??FA	NJM78??FA	RC78M??FA	RC78??FA
+5V	NJM78M05FA	NJM7805FA	RC78M05FA	RC7805FA
+6V	NJM78M06FA	NJM7806FA	RC78M06FA	RC7806FA
+8V	NJM78M08FA	NJM7808FA	----------	RC7808FA
+9V	NJM78M09FA	NJM7809FA	RC78M09FA	RC7809FA
+12V	NJM78M12FA	NJM7812FA	RC78M12FA	RC7812FA
+15V	NJM78M15FA	NJM7815FA	RC78M15FA	RC7815FA
+18V	NJM78M18FA	NJM7818FA	----------	RC7818FA
+20V	NJM78M20FA	NJM7820FA	----------	RC7820FA
+24V	NJM78M24FA	NJM7824FA	----------	RC7824FA


3
INPUT
OUTPUT
1
COMMON
2

SN74HC00ANS (TI) FLAT PACKAGE
C-MOS QUAD 2-INPUT NAND GATE
– TOP VIEW –


14
13
12
11
10
9
8
VDD
GND
1
2
3
4
5
6
7



$Y = \overline{A \cdot B} = \bar{A} + \bar{B}$

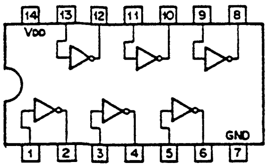
A	B	Y	
0	0	1	
0	1	1	
1	0	1	0; LOW LEVEL
1	1	0	1; HIGH LEVEL

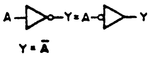
NOTE :

TYPE	VDD
TC74AC00P TC74AC00F	+2 to +5.5V
MC74HCT00N 74ACT00PC	+5V
OTHER TYPES	+2 to +6V

SN74HC04ANS (TI) FLAT PACKAGE

C-MOS HEX INVERTER
- TOP VIEW -


14
13
12
11
10
9
8
VDD
GND
1
2
3
4
5
6
7



Y = $\overline{A}$

A	Y
0	1
1	0

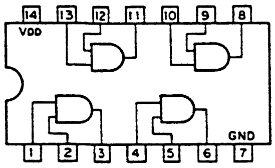
0: LOW LEVEL
1: HIGH LEVEL

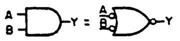
NOTE :

TYPE	VDD
74ACT04 TYPES 74HCT04 TYPES	+5V
TC74AC04F	+2 to +5.5V
TC74ACT04F	+4.5 to +5.5V
OTHER TYPES	+2 to +6V

SN74HC08ANS (TI) FLAT PACKAGE

C-MOS QUAD 2-INPUT AND GATE
- TOP VIEW -


14
13
12
11
10
9
8
VDD
GND
1
2
3
4
5
6
7



Y = A·B = $\overline{\overline{A}+\overline{B}}$

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

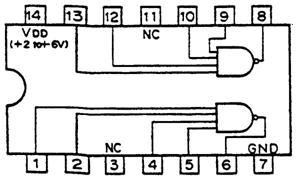
0; LOW LEVEL
1; HIGH LEVEL

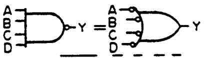
NOTE :

TYPE	VDD
TC74AC08F	+2 to +5.5V
OTHER TYPES	+2 to +6V

SN74HC20ANS (TI) FLAT PACKAGE

C-MOS 4-INPUT POSITIVE-NAND GATE
- TOP VIEW -


14
13
12
11
10
9
8
VDD
(+2 to+6V)
NC
NC
GND
1
2
3
4
5
6
7


A
B
C
D
Y
A
B
C
D
Y

Y = $\overline{A\cdot B\cdot C\cdot D} = \overline{A}+\overline{B}+\overline{C}+\overline{D}$

A	B	C	D	Y
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
⋮	⋮	⋮	⋮	⋮
1	1	0	1	1
1	1	1	0	1
1	1	1	1	0

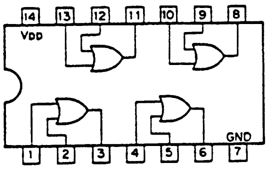
0; LOW LEVEL
1; HIGH LEVEL

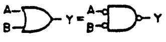
NOTE :

TYPE	VDD
TC74AC20	+2V to +5.5V
OTHER TYPES	+2V to +6V

SN74HC32ANS (TI) FLAT PACKAGE

C-MOS 2-INPUT OR GATE
- TOP VIEW -


14
13
12
11
10
9
8
VDD
GND
1
2
3
4
5
6
7



Y = A+B = $\overline{\overline{A}\cdot\overline{B}}$

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

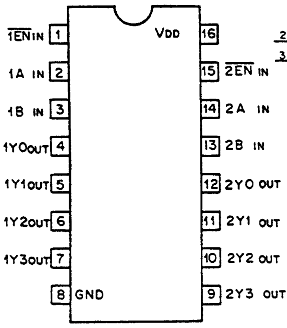
0: LOW LEVEL
1: HIGH LEVEL

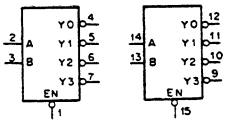
NOTE :

TYPE	VDD
TC74AC32	+2 to +5.5V
OTHER TYPES	+2 to +6V

SN74HC139ANS (TI) FLAT PACKAGE

C-MOS DUAL 2-TO-4 DECODER/DEMULTIPLEXER
- TOP VIEW -


$\overline{1EN}$ IN 1
1A IN 2
1B IN 3
1Y0OUT 4
1Y1OUT 5
1Y2OUT 6
1Y3OUT 7
8 GND
VDD 16
15 $\overline{2EN}$ IN
14 2A IN
13 2B IN
12 2Y0 OUT
11 2Y1 OUT
10 2Y2 OUT
9 2Y3 OUT


2
3
A
B
Y0
Y1
Y2
Y3
4
5
6
7
EN
1
14
13
A
B
Y0
Y1
Y2
Y3
12
11
10
9
EN
15

INPUTS			OUTPUTS			
EN	B	A	Y3	Y2	Y1	Y0
0	0	0	1	1	1	0
0	0	1	1	1	0	1
0	1	0	1	0	1	1
0	1	1	0	1	1	1
1	X	X	1	1	1	1

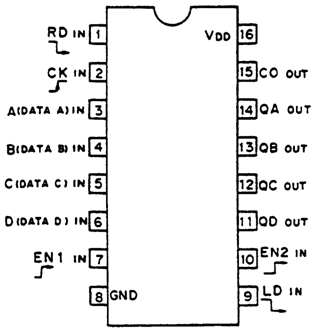
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

NOTE :

TYPE	VDD
74AC/74HC	+2 to +6V
74ACT	+5V
TC74AC139	+2 to +5.5V

SN74HC163ANS (TI) FLAT PACKAGE

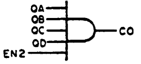
C-MOS PRESETTABLE SYNCHRONOUS 4-BIT BINARY COUNTER
- TOP VIEW -


RD IN 1
CK IN 2
A(DATA A) IN 3
B(DATA B) IN 4
C(DATA C) IN 5
D(DATA D) IN 6
EN1 IN 7
8 GND
VDD 16
15 CO OUT
14 QA OUT
13 QB OUT
12 QC OUT
11 QD OUT
10 EN2 IN
9 LD IN

MODE SELECTION

CONTROL INPUTS				MODE
RD	LD	EN1	EN2	
0	X	X	X	RESET (SYNCHRONOUS)
1	0	X	X	PRESET (SYNCHRONOUS)
1	1	0	X	NO COUNT
1	1	X	0	NO COUNT
1	1	1	1	COUNT

CARRY OUTPUT "CO"


QA
QB
QC
QD
EN2
CO

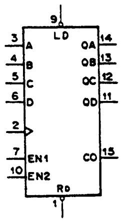
CO IS HIGH WHEN EN2 INPUT IS HIGH AND COUNT IS "15"

COUNT SEQUENCE

COUNT	OUTPUTS			
	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

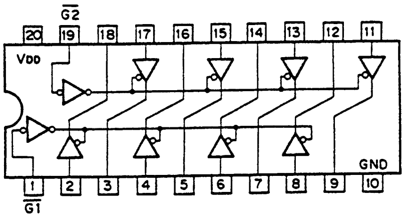
NOTE :

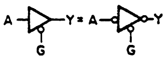
TYPE	VDD
74ACT	+5V
TC74AC163	+2 to +5.5V
OTHER TYPES	+2 to +6V


9
LD
3 A
4 B
5 C
6 D
2
7 EN1
10 EN2
RD
1
QA 14
QB 13
QC 12
QD 11
CO 15

SN74HCT244ANS (TI) FLAT PACKAGE

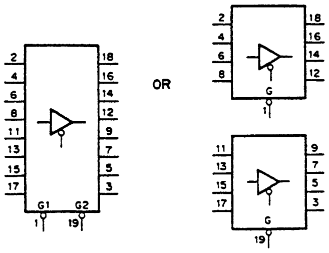
C-MOS BUS BUFFER WITH 3-STATE OUTPUTS
- TOP VIEW -


G2
20 19 18 17 16 15 14 13 12 11
VDD
GND
1 2 3 4 5 6 7 8 9 10
G1



G	A	Y
0	0	0
0	1	1
1	X	HI-Z

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE

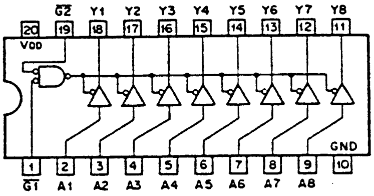

2 4 6 8 11 13 15 17
18 16 14 12 9 7 5 3
G1 G2
1 19
OR
2 4 6 8
18 16 14 12
G
1
11 13 15 17
9 7 5 3
G
19

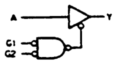
NOTE :

TYPE	VDD
AC HC 40H	+2 to +6V
ACT HCT	+5V

SN74HC541ANS (TI) FLAT PACKAGE

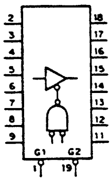
C-MOS BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS
- TOP VIEW -


G2 Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8
20 19 18 17 16 15 14 13 12 11
VDD
GND
1 2 3 4 5 6 7 8 9 10
G1 A1 A2 A3 A4 A5 A6 A7 A8



G1	G2	A	Y
0	0	0	0
0	0	1	1
1	X	X	HI-Z
X	1	X	HI-Z

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE

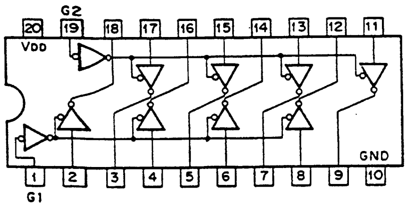

2 3 4 5 6 7 8 9
18 17 16 15 14 13 12 11
G1 G2
1 19

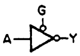
NOTE :

TYPE	VDD
AC	+2 to +5 5V
HC	+2 to +6V
ACT/HCT	+5V

SN74HC240ANS (TI) FLAT PACKAGE

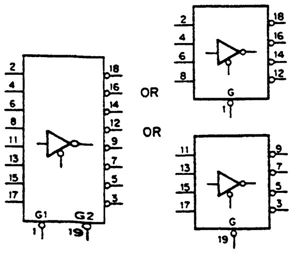
C-MOS 3-STATE INVERTER/LINE DRIVER
- TOP VIEW -


G2
20 19 18 17 16 15 14 13 12 11
VDD
GND
1 2 3 4 5 6 7 8 9 10
G1



G	A	Y
0	0	1
0	1	0
1	X	HI-Z

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE

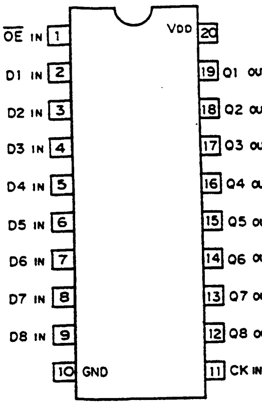

2 4 6 8 11 13 15 17
18 16 14 12 9 7 5 3
G1 G2
1 19
OR
OR
2 4 6 8
18 16 14 12
G
1
11 13 15 17
9 7 5 3
G
19

NOTE :

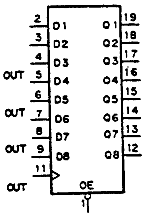
TYPE	VDD
74AC/74HC	+2 to +6V
74ACT/74HCT	+5V
TC74AC240F TC74AC240P	+2 to +5.5V

SN74HC573BNS (TI) FLAT PACKAGE

C-MOS 3-STATE OUTPUTS OCTAL LATCHES
– TOP VIEW –



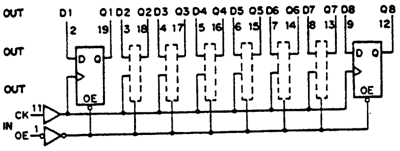
$\overline{OE}$ IN 1
D1 IN 2
D2 IN 3
D3 IN 4
D4 IN 5
D5 IN 6
D6 IN 7
D7 IN 8
D8 IN 9
10 GND
VDD 20
19 Q1 OUT
18 Q2 OUT
17 Q3 OUT
16 Q4 OUT
15 Q5 OUT
14 Q6 OUT
13 Q7 OUT
12 Q8 OUT
11 CK IN



D1
D2
D3
D4
D5
D6
D7
D8
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
OE

INPUTS			OUT
OE	CK	D	Q
0	1	1	1
0	1	0	0
0	0	X	Qo
1	X	X	HI-Z

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE
Qo ; NO CHANGE



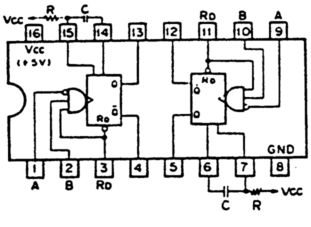
D1
Q1 D2
Q2 D3
Q3 D4
Q4 D5
Q5 D6
Q6 D7
Q7 D8
Q8
CK
OE

NOTE :

TYPE	VDD
AC	+2 to +6V
HC	
ACT	+5V
HCT	
TC74AC573	+2 to +5.5V

SN74LS123NS (TI) FLAT PACKAGE

TTL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR WITH DIRECT RESET
– TOP VIEW –

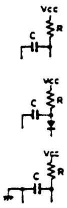


VCC
R
C
RD
B
A
Vcc (+5V)
GND
A
B
RD
C
R
VCC

INPUTS			OUTPUTS	
RD	A	B	Q	$\overline{Q}$
0	X	X	0	1
X	1	X	0	1
X	X	0	0	1
1	0	↑	⊓	⊔
1	↓	1	⊓	⊔
↑	0	1	⊓	⊔

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

OUTPUT PULSE WIDTH



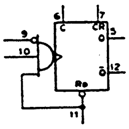
'123 ; $T_W = 0.28\left(1+\frac{700}{R}\right)CR$

'L123; $T_W = 0.33\left(1+\frac{700}{R}\right)CR$

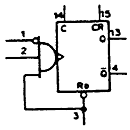
'123 ; $T_W = 0.25\left(1+\frac{700}{R}\right)CR$

'L123; $T_W = 0.29\left(1+\frac{700}{R}\right)CR$

'LS123, $T_W = 0.45CR$



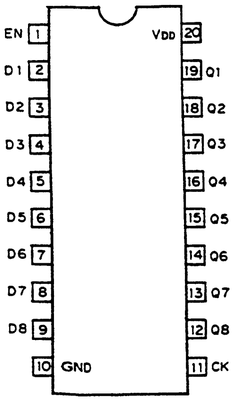
6
7
C
CR
9
10
5
12
RD
11



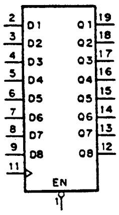
14
15
C
CR
1
2
13
4
RD
3

SN74HC574ANS (TI) FLAT PACKAGE

C-MOS 3-STATE D-TYPE EDGE-TRIGGERED FLIP-FLOP
– TOP VIEW –



EN 1
D1 2
D2 3
D3 4
D4 5
D5 6
D6 7
D7 8
D8 9
10 GND
VDD 20
19 Q1
18 Q2
17 Q3
16 Q4
15 Q5
14 Q6
13 Q7
12 Q8
11 CK

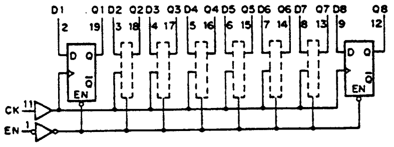


D1
D2
D3
D4
D5
D6
D7
D8
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
EN

EACH FLIP-FLOP

INPUTS			OUT
EN	CK	D	Q
0	↑	1	1
0	↑	0	0
0	↓	X	Qo
1	X	X	HI-Z

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE
Qo ; NO CHANGE



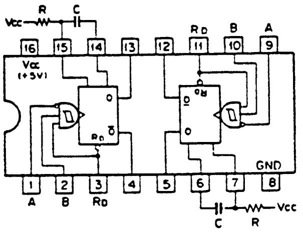
D1
Q1 D2
Q2 D3
Q3 D4
Q4 D5
Q5 D6
Q6 D7
Q7 D8
Q8
CK
EN

NOTE :

TYPE	VDD
74AC／74HC	+2 to +6V
74ACT／74HCT	+5V
TC74AC574F	+2 to +5.5V

SN74LS221NS (TI) FLAT PACKAGE

TTL MONOSTABLE MULTIVIBRATOR WITH SCHMITT TRIGGER INPUT
– TOP VIEW –

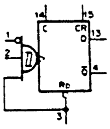


Vcc
R
C
RD
B
A
Vcc (+5V)
GND
A
B
RD
C
R
Vcc

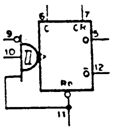
INPUTS			OUTPUTS	
RD	A	B	Q	$\overline{Q}$
0	X	X	0	1
X	1	X	0	1
X	X	0	0	1
1	0	↑	⊓	⊔
1	↓	1	⊓	⊔
↑	0	1	⊓	⊔

0;LOW LEVEL
1;HIGH LEVEL
X;DON'T CARE

OUTPUT PULSE WIDTH = 0.7CR



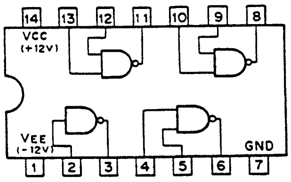
14
15
C
CR
1
2
13
4
RD
3



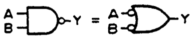
6
7
C
CR
9
10
5
12
RD
11

SN75188NS (TI) FLAT PACKAGE

2-INPUT (1-INPUT) POSITIVE-NAND LINE DRIVER
– TOP VIEW –



VCC (+12V)
VEE (−12V)
GND



$Y = \overline{A \cdot B} = \overline{A} + \overline{B}$

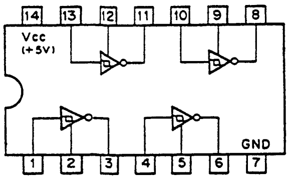
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

0: LOW LEVEL
1: HIGH LEVEL

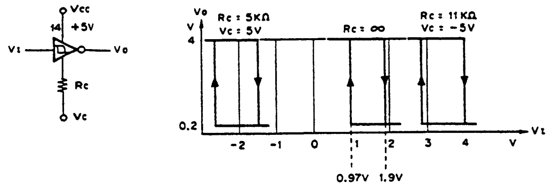
SN75189ANS (TI) FLAT PACKAGE

QUADRUPLE LINE RECEIVER

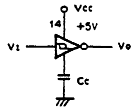
- TOP VIEW -


14
13
12
11
10
9
8
Vcc
(+5V)
GND
1
2
3
4
5
6
7

INPUT THRESHOLD SHIFTING



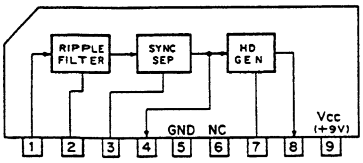
INPUT NOISE FILTERING


Vcc
14
+5V
Vi
Vo
Cc

TA7357AP (TOSHIBA)

SYNC SEPARATOR/HD PULSE GENERATOR

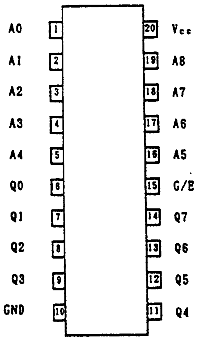
— SIDE VIEW —


RIPPLE FILTER
SYNC SEP
HD GEN
GND
NC
Vcc
(+9V)
1
2
3
4
5
6
7
8
9

TBP28L42N(TI)

TTL 4096 BIT PROGRAMABLE READ ONLY MEMORY

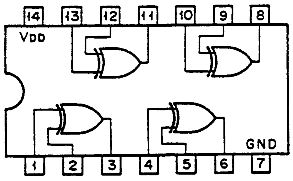
— TOP VIEW —

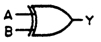

A0
1
A1
2
A2
3
A3
4
A4
5
Q0
6
Q1
7
Q2
8
Q3
9
GND
10
20
Vcc
19
A8
18
A7
17
A6
16
A5
15
G/E
14
Q7
13
Q6
12
Q5
11
Q4

TC74HC86AF (TOSHIBA) FLAT PACKAGE

C-MOS EXCLUSIVE OR GATE

- TOP VIEW -


14
13
12
11
10
9
8
VDD
GND
1
2
3
4
5
6
7



$Y = \bar{A} \cdot B + A \cdot \bar{B}$

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

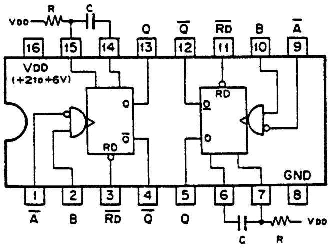
0;LOW LEVEL
1;HIGH LEVEL

TYPE	VDD
TC74AC86F	+2 to +5.5V
OTHER TYPES	+2 to +6V

TC74HC123AF (TOSHIBA) FLAT PACKAGE

C-MOS DUAL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR

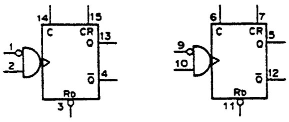
- TOP VIEW -


VDD
R
C
Q
Q̄
RD
B
Ā
16
15
14
13
12
11
10
9
VDD
(+2to+6V)
GND
1
2
3
4
5
6
7
8
Ā
B
RD
Q̄
Q
C
R
VDD

INPUT			OUTPUT	
RD	A	B	Q	Q̄
0	X	X	0	1
1	1	X	0	1
1	X	0	0	1
1	0	↑	⊓	⊔
1	↓	1	⊓	⊔
↑	0	1	⊓	⊔

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

OUTPUT PULSE WIDTH = 0.46CR

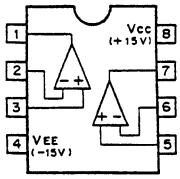

14
15
C
CR
13
Q
Q̄
4
1
2
RD
3
6
7
C
CR
5
Q
Q̄
12
9
10
RD
11

TL082CPS (TI) FLAT PACKAGE

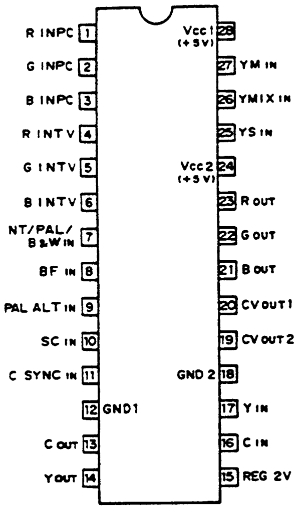
OPERATIONAL AMPLIFIER

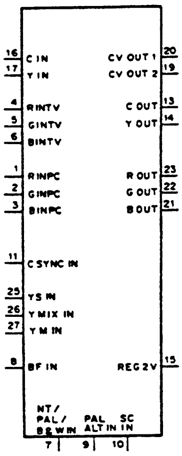
(J FET-INPUT)

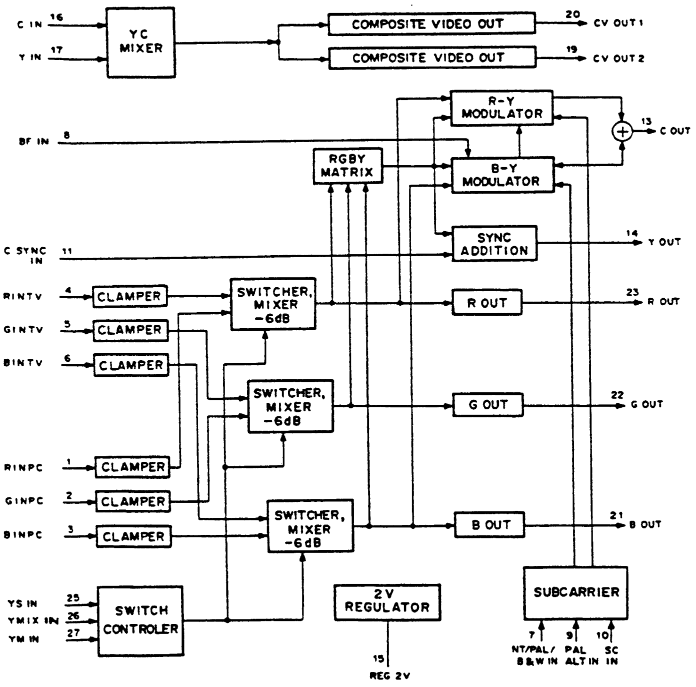
- TOP VIEW -


1
2
3
4
Vcc
(+15V)
8
7
6
5
VEE
(-15V)

V7040 (SONY)
NTSC/PAL ENCODER
— TOP VIEW —


R INPC 1
G INPC 2
B INPC 3
R INTV 4
G INTV 5
B INTV 6
NT/PAL/ B&W IN 7
BF IN 8
PAL ALT IN 9
SC IN 10
C SYNC IN 11
12 GND1
C OUT 13
Y OUT 14
Vcc1 (+5V) 28
27 YM IN
26 YMIX IN
25 YS IN
Vcc2 (+5V) 24
23 R OUT
22 G OUT
21 B OUT
20 CV OUT1
19 CV OUT2
GND 2 18
17 Y IN
16 C IN
15 REG 2V


16 C IN
17 Y IN
4 RINTV
5 GINTV
6 BINTV
1 RINPC
2 GINPC
3 BINPC
11 C SYNC IN
25 YS IN
26 YMIX IN
27 YM IN
8 BF IN
CV OUT1 20
CV OUT2 19
C OUT 13
Y OUT 14
R OUT 23
G OUT 22
B OUT 21
REG 2V 15
NT/ PAL/ B&W IN 7
PAL ALT IN 9
SC IN 10


C IN 16
Y IN 17
YC MIXER
COMPOSITE VIDEO OUT
COMPOSITE VIDEO OUT
20 CV OUT1
19 CV OUT2
R-Y MODULATOR
B-Y MODULATOR
13 C OUT
BF IN 8
RGBY MATRIX
SYNC ADDITION
14 Y OUT
C SYNC IN 11
RINTV 4
GINTV 5
BINTV 6
CLAMPER
SWITCHER, MIXER -6dB
R OUT
23 R OUT
G OUT
22 G OUT
B OUT
21 B OUT
RINPC 1
GINPC 2
BINPC 3
YS IN 25
YMIX IN 26
YM IN 27
SWITCH CONTROLER
2V REGULATOR
15 REG 2V
SUBCARRIER
7 NT/PAL/ B&W IN
9 PAL ALT IN
10 SC IN

FUNCTION TABLE

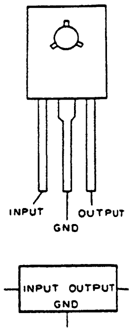
PIN NO.	SYMBOLIC NAME	DESCRIPTION
1	RINPC	RED INPUT FROM PERSONAL COMPUTER
2	GINPC	GREEN INPUT FROM PERSONAL COMPUTER
3	BINPC	BLUE INPUT FROM PERSONAL COMPUTER
4	RINTV	RED INPUT FROM TV
5	GINTV	GREEN INPUT FROM TV
6	BINTV	BLUE INPUT FROM TV
7	NT/PAL/B&W IN	MODE SELECTION VOLTAGE INPUT NTSC MODE: $4.0V \leqq V7$ PAL MODE: $2.0V \leqq V7 \leqq 3.0V$ BLACK AND WHITE MODE: $V7 \leqq 0.8V$ V7 IS THE VOLTAGE MUST BE APPLIED
8	BF IN	BURST FLAG SIGNAL INPUT
9	PAL ALT IN	PAL LINE ALTERNATION PULSE INPUT
10	SC IN	SUBCARRIER INPUT
11	C SYNC IN	COMPOSITE SYNCHRONIZING SIGNAL INPUT
12	GND1	GROUND EXCLUDED RGB OUT AND CV OUT
13	C OUT	CHROMA SIGNAL OUTPUT
14	Y OUT	Y SIGNAL OUTPUT
15	REG 2V	REFERENCE VOLTAGE
16	C IN	CHROMA SIGNAL INPUT
17	Y IN	Y SIGNAL INPUT
18	GND2	GROUND FOR RGB OUT AND CV OUT STAGES
19	CV OUT2	COMPOSITE VIDEO SIGNAL OUTPUT
20	CV OUT1	
21	B OUT	BLUE SIGNAL OUTPUT
22	G OUT	GREEN SIGNAL OUTPUT
23	R OUT	RED SIGNAL OUTPUT
24	Vcc2	Vcc FOR RGB OUT AND CV OUT STAGES
25	YS IN	See below table.
26	YMIX IN	
27	YM IN	
28	Vcc1	Vcc EXCLUDED RGB OUT AND CV OUT STAGES

YS/YMIX/YM SWITCH TABLE

YS	YMIX	YM	MODE
L	L	L	TV
L	L	H	HALF TONE
L	H	L	TV
L	H	H	HALF TONE
H	L	L	PC
H	L	H	PC
H	H	L	MIX
H	H	H	MIX

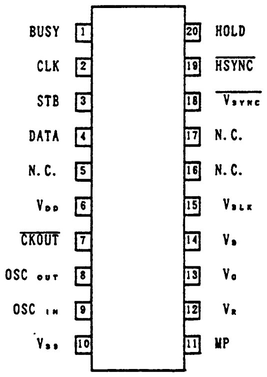
$L \leqq 0.8V$
$H \geqq 2.0V$

UPC78N05H (NEC) +5V
POSITIVE VOLTAGE REGULATOR
- FRONT VIEW -

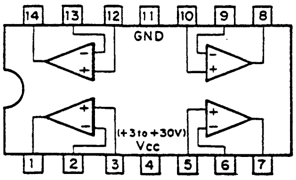

INPUT
GND
OUTPUT
INPUT OUTPUT
GND

UPD6451AGT(NEC)
C-MOS ON DISPLAY CHARACTOR GENERATOR

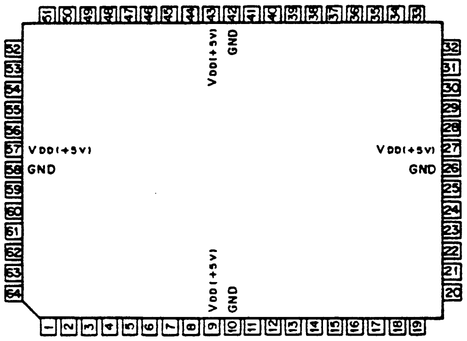
— TOP VIEW —


BUSY 1
CLK 2
STB 3
DATA 4
N.C. 5
VDD 6
CKOUT 7
OSC OUT 8
OSC IN 9
VSS 10
20 HOLD
19 HSYNC
18 VSYNC
17 N.C.
16 N.C.
15 VBLK
14 VB
13 VG
12 VR
11 MP

UPC324G2 (NEC) FLAT PACKAGE
QUAD. OP AMPLIFIER
- TOP VIEW -

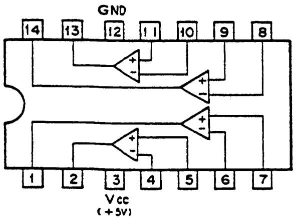

14
13
12
11
10
9
8
GND
(+3to+30V)
Vcc
1
2
3
4
5
6
7

uPD65006GF-250-3B8 (NEC)
C-MOS
— TOP VIEW —


VDD(+5V)
GND
VDD(+5V)
GND
VDD(+5V)
GND
VDD(+5V)
GND

PIN NO	PIN NAME	PIN NO.	PIN NAME	PIN NO.	PIN NAME	PIN NO.	PIN NAME
1		17	P8	33		49	INT VD
2		18	P9	34		50	
3	MEMO HDL	19	P10	35	HDL7	51	
4	SWD HDL	20	CAS1	36	HDL6	52	INT HD
5	SWD VD	21	CAS2	37	HDL5	53	INT SYNC
6	VBLK	22	CUP	38	HDL4	54	SWD HD
7	P0	23	VBLK	39	HDL3	55	MONI SYNC
8	P1	24	$\overline{\text{A.EN}}$	40	HDL2	56	SIG DET
9	VDD	25	IN/$\overline{\text{M}}$	41	HDL1	57	VDD
10	GND	26	GND	42	GND	58	GND
11	P2	27	VDD	43	VDD	59	HD
12	P3	28	HD RET	44	D/A CK	60	SYNC
13	P4	29	HD OUT	45	$\overline{\text{RAS}}$	61	VD
14	P5	30	RES	46	CK	62	FULL /SPLIT
15	P6	31	HDL9	47	EXT D/A	63	SP9/$\overline{\text{SP4}}$
16	P7	32	HDL8	48	INT D/A	64	IN/$\overline{\text{MEMO}}$

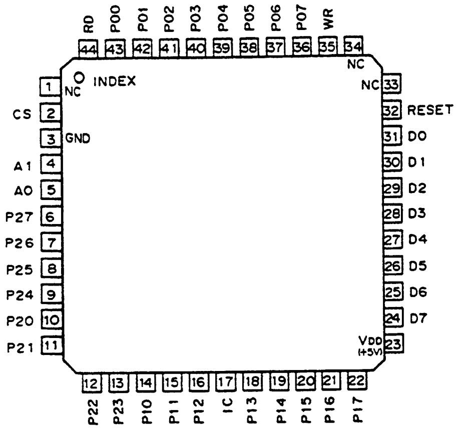
UPC339G2 (NEC) FLAT PACKAGE
COMPARATOR
- TOP VIEW -

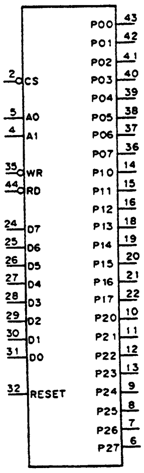

GND
14
13
12
11
10
9
8
1
2
3
4
5
6
7
Vcc
(+5V)

UPD71055GB-3B4 (NEC) FLAT PACKAGE

C-MOS PARALLEL INTERFACE UNIT

– TOP VIEW –


RD
P00
P01
P02
P03
P04
P05
P06
P07
WR
44
43
42
41
40
39
38
37
36
35
34
NC
INDEX
1 NC
CS 2
3 GND
A1 4
A0 5
P27 6
P26 7
P25 8
P24 9
P20 10
P21 11
NC 33
32 RESET
31 D0
30 D1
29 D2
28 D3
27 D4
26 D5
25 D6
24 D7
VDD (+5V) 23
12
13
14
15
16
17
18
19
20
21
22
P22
P23
P10
P11
P12
IC
P13
P14
P15
P16
P17


2 CS
5 A0
4 A1
35 WR
44 RD
24 D7
25 D6
26 D5
27 D4
28 D3
29 D2
30 D1
31 D0
32 RESET
P00 43
P01 42
P02 41
P03 40
P04 39
P05 38
P06 37
P07 36
P10 14
P11 15
P12 16
P13 18
P14 19
P15 20
P16 21
P17 22
P20 10
P21 11
P22 12
P23 13
P24 9
P25 8
P26 7
P27 6

A1, A0 : ADDRESS
CS : CHIP SELECT
D7 – D0 : DATA BUS
P07 – P00 : PORT 0
P17 – P10 : PORT 1
P27 – P20 : PORT 2
RD : READ STROBE
WR : WRITE STROBE

IC : INTERNALLY CONNECTED

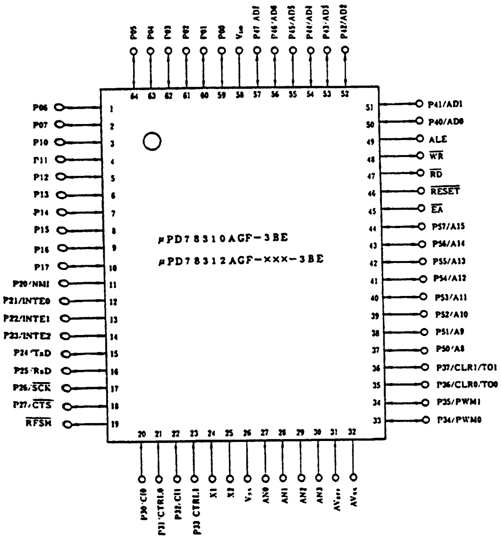
CS	RD	WR	A1	A0	OPERATION	CPU ACTION
0	0	1	0	0	PROT 0 → DATA · BUS	INPUT
0	0	1	0	1	PROT 1 → DATA · BUS	INPUT
0	0	1	1	0	PROT 2 → DATA · BUS	INPUT
0	0	1	1	1	DISABLE	
0	0	0	X	X		
0	1	0	0	0	DATA · BUS → PROT 0	OUTPUT
0	1	0	0	1	DATA · BUS → PROT 1	OUTPUT
0	1	0	1	0	DATA · BUS → PROT 2	OUTPUT
0	1	0	1	1	DATA · BUS → COMMAND REGISTER	OUTPUT
0	1	1	X	X	HIGH IMPEDANCE	
1	X	X	X	X		

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

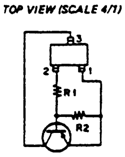
uPD78310AGF-3BE (NEC)

C-MOS 16/8 BIT ONE CHIP MICROCOMPUTER

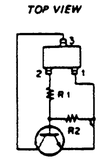
– TOP VIEW –


P05
P04
P03
P02
P01
P00
Vss
P47/AD7
P46/AD6
P45/AD5
P44/AD4
P43/AD3
P42/AD2
64
63
62
61
60
59
58
57
56
55
54
53
52
P06 1
P07 2
P10 3
P11 4
P12 5
P13 6
P14 7
P15 8
P16 9
P17 10
P20/NMI 11
P21/INTE0 12
P22/INTE1 13
P23/INTE2 14
P24/TxD 15
P25/RxD 16
P26/SCK 17
P27/CTS 18
RFSH 19
51 P41/AD1
50 P40/AD0
49 ALE
48 WR
47 RD
46 RESET
45 EA
44 P57/A15
43 P56/A14
42 P55/A13
41 P54/A12
40 P53/A11
39 P52/A10
38 P51/A9
37 P50/A8
36 P37/CLR1/TO1
35 P36/CLR0/TO0
34 P35/PWM1
33 P34/PWM0
μPD78310AGF-3BE
μPD78312AGF-×××-3BE
20
21
22
23
24
25
26
27
28
29
30
31
32
P30/CI0
P31/CTRL0
P32/CI1
P33/CTRL1
X1
X2
Vcc
AN0
AN1
AN2
AN3
AVref
AVcc

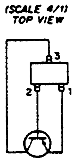
DTA114EK
(R1 = 10K, R2 = 10K)


TOP VIEW (SCALE 4/1)
3
2
1
R1
R2

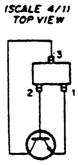
DTC124EK
(R1 = 22K, R2 = 22K)


TOP VIEW
3
2
1
R1
R2

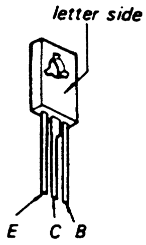
2SA812


(SCALE 4/1)
TOP VIEW
3
2
1

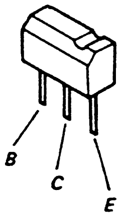
2SD992A
2SC1623
2SC2714
2SC2757
2SC3326N


(SCALE 4/1)
TOP VIEW
3
2
1

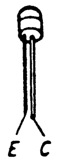
2SB772-P


letter side
E
C
B

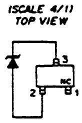
2SC1652-Q



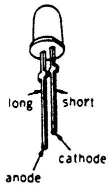
TPS612-B



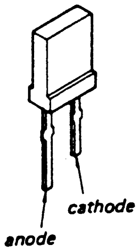
RD3.9M-B2
RD4.7M-B2
RD7.5M-B2


(SCALE 4/1)
TOP VIEW
3
NC
2
1

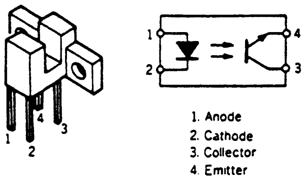
SIR-481ST3F


long
short
cathode
anode

SLP-255B-51
SLP-655B-50

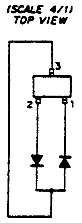

cathode
anode

TLP805

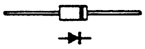


1. Anode
2. Cathode
3. Collector
4. Emitter

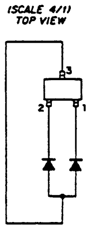
1SS123


(SCALE 4/1)
TOP VIEW
3
2
1

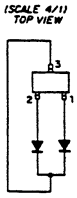
10E-2
1SS133



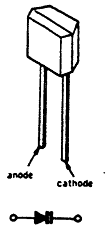
1S2835


(SCALE 4/1)
TOP VIEW
3
2
1

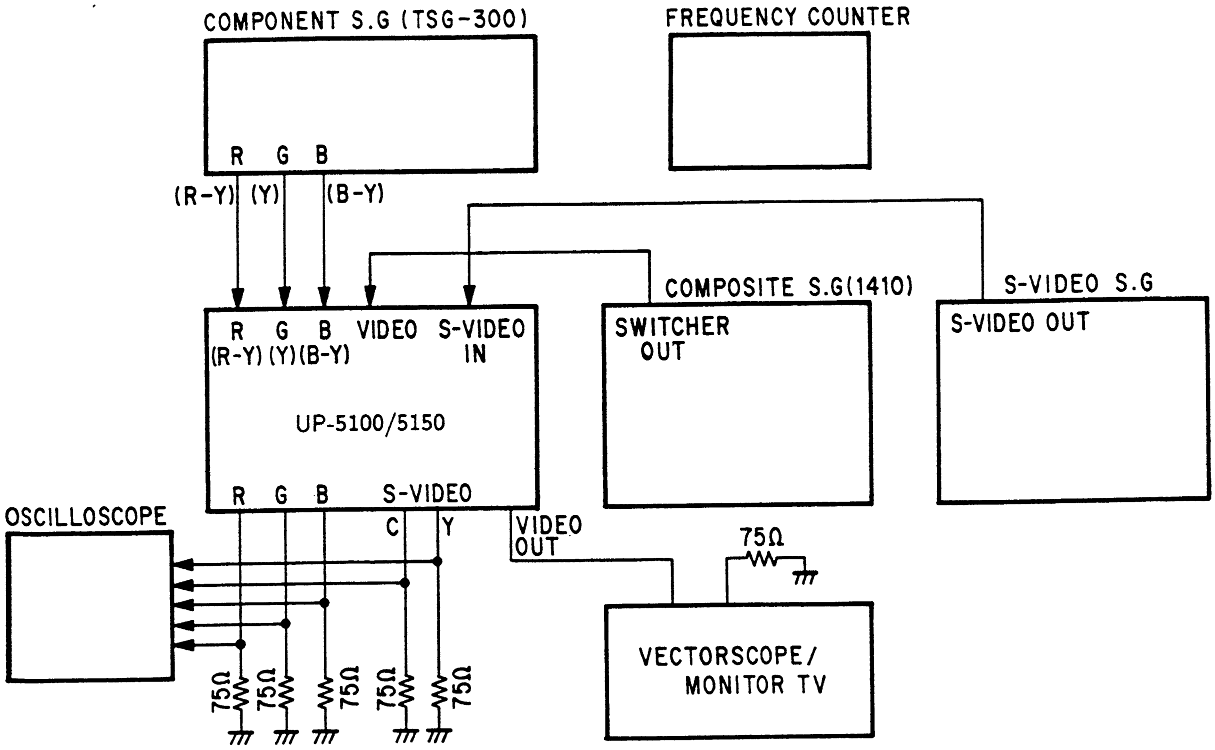
1S2837


(SCALE 4/1)
TOP VIEW
3
2
1

1SV101


anode
cathode

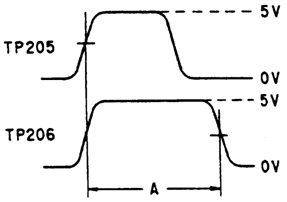
SECTION 5
ELECTRICAL ADJUSTMENTS


COMPONENT S.G (TSG-300)
R G B
(R-Y) (Y) (B-Y)
FREQUENCY COUNTER
COMPOSITE S.G(1410)
SWITCHER OUT
S-VIDEO S.G
S-VIDEO OUT
R G B VIDEO S-VIDEO IN
(R-Y) (Y) (B-Y)
UP-5100/5150
R G B S-VIDEO
C Y
VIDEO OUT
OSCILLOSCOPE
75Ω
VECTORSCOPE/ MONITOR TV
75Ω
75Ω
75Ω
75Ω
75Ω
75Ω

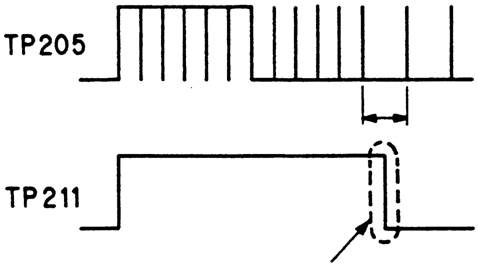
- The volume of the front panel shall all be set to the center click position. (GAIN , HUE , COLOR)
- The volume of the rear panel shall all be set to the center click position. (R , G , B)
- Rear panel
  - VIDEO 75Ω SW : Set to ON
  - R.G.B 75Ω SW : Set to ON
  - R.G.B / R-Y , B-Y SW : Set to RGB
- Set the AGC switch of the front panel to manual position.

- COMPOSITE S.G (1410)
  FULL FIELD, AMPLE = 75%
  WHITE REF = 100 IRE
- COMPOSITE S.G (TSG-300)
  100 IRE/100% COLOR BAR
- S-VIDEO S.G (TSG-130)
  100 IRE/75% COLOR BAR

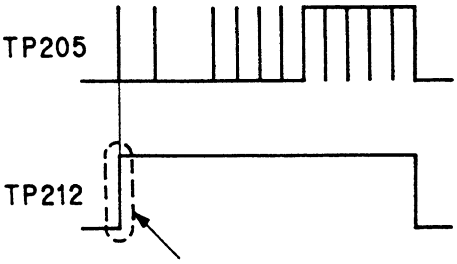
5 - 1. Clamp Pulse Delay Adjustment (VA-26 Board)

Composition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO	TP205(F-5) = CH-1 TP206(G-5) = CH-2 E102(GND)(F-7)  5V TP205 0V 5V TP206 0V A 2V/DIV 1μs/DIV A = 5.6 ± 0.1μs	RV201(F-5) TRIG : CH-1

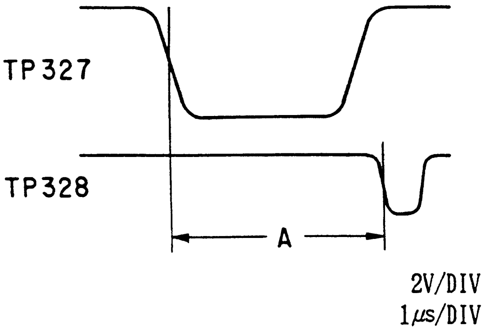
5 - 2. V . BLK Pulse Post-edge Adjustment (VA-26 Board)

Composition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO	TP205(F-5) = CH-1 TP211(F-6) = CH-2  It is sufficient if this part is inserted between the above pulse.	RV203(E-6) TRIG : CH-2

5 - 3. V . BLK Pulse Pre-edge Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO	TP205(F-5) = CH-1 TP212(F-5) = CH-2  Adjust this part with the start of the above pulse.	RV204(E-6) TRIG : CH-2

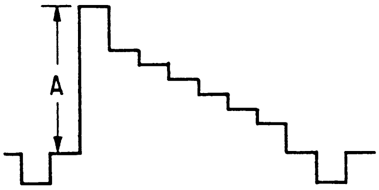
5 - 4. Burst Flag Position Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO	TP327(F-3) = CH-1 TP328(F-3) = CH-2  A = 5.6 ± 0.1μs	RV311(F-4) TRIG : CH-1

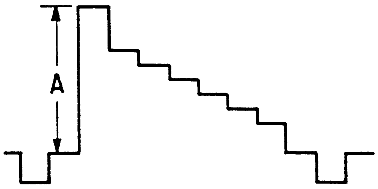
5 - 5. APC Free-Run Frequency Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO 2. Rotate the COLOR volume (DSC-9 board) on the front panel fully counterclockwise. 3. Set S301(F-2) on the VA-26 board to ADJ. 4. Rotate RV309 fully counter clockwise. 5. After adjustment, return the COLOR volume to the centerclick position and set S301(F-2) back to NORM. 6. Perform 5-8. B-Y level adjustment.	TP326(G-2) E305(GND)(F-1) 3.579545MHz ± 50Hz	RV312(F-4)

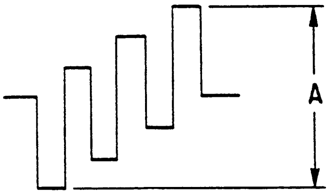
5 - 6. Y Level (1) Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO	TP332(G-2) E305(GND)(F-1)  A = 714mV ± 10mV	RV304(J-3) TRIG : CH-1

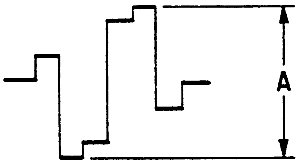
5 - 7. Y Level (2) Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO	TP323(F-3) E305(GND)(F-1)  A = 684mV ± 10mV	RV314(G-2) TRIG : CH-1

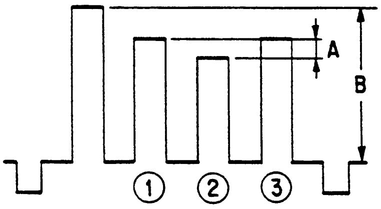
5 - 8. B-Y Level Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO 2. Rotate RV315 fully clockwise.	TP324(G-1) E305(GND)(F-1)  1. A = 1.27 ± 0.02 Vp-p 2. A = 670mV ± 20mVp-p	RV309(F-2) = 1 RV315(G-2) = 2 TRIG : CH-1

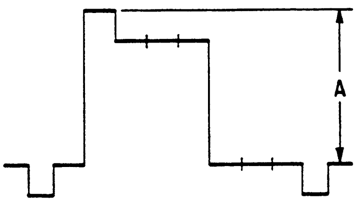
5 - 9. R-Y Level Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO	TP325 (G-1) E305(GND)(F-1)  A = 670mV ± 20mVp-p	RV303(G-2) TRIG : CH-1

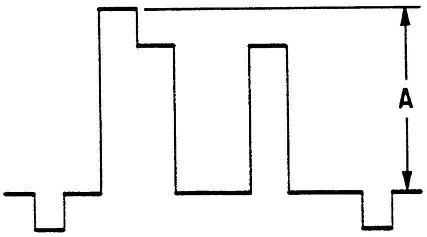
5 - 10. Blue Level • HUE Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO 2. Coincide the amplitudes of waveforms ①, ② and③ using RV313.	TP317(J-1) E304(GND)(J-3)  100 mV/DIV 10 μs/DIV A = Coincide B = 670 ± 0.02 Vp-p	RV313(F-1) • • • A RV308(H-2) • • • B TRIG : CH-1

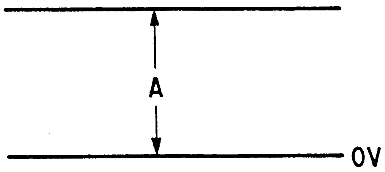
5 - 11. G Level Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO	TP316(J-2)  100 mV/DIV 10 µs/DIV A = 670mV ± 20mVp-p	RV307(J-2) TRIG : CH-1

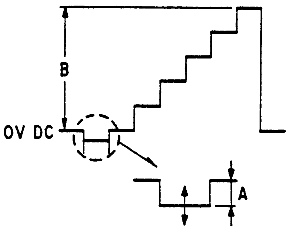
5 - 12. R Level Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO	TP315(J-1)  100 mV/DIV 10 µs/DIV A = 670mV ± 20mV	RV305(J-2) TRIG : CH-1

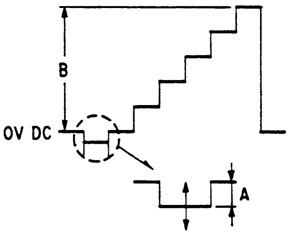
5 - 13. A/D Ref Level Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO • GAIN volume (DSC-9 board) :center click • AGC switch (DSC-9 board) :manual	TP4(M-1) E1(GND)(N-3)  A = 1.8 ± 0.02 Vp-p	RV16(M-2) TRIG : CH-1

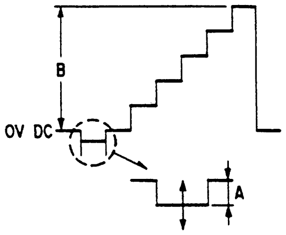
5 - 14. R Level (A/D IN) Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. • Input select = R.G.B • Input signal = 5 stair steps (TSG-300) 2. Adjust the pedestal level to 0V DC using RV9 and minimize A using RV10. 3. Alternately rotating RV2 and RV9, adjust the the pedestal level and white peak.	TP1(P-1)  DC 500 mV/DIV 10 μs/DIV A = Minimum B = 1.8 ± 0.02 Vp-p	RV9(M-3) RV10(N-3) RV2(M-3) TRIG : CH-1

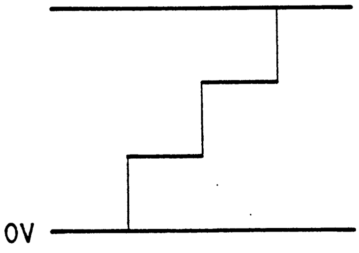
5 - 15. G Level (A/D IN) Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. • Input select = R.G.B • Input signal = 5 stair steps (TSG-300) 2. Adjust the pedestal level to 0V DC using RV8 and minimize A using RV3. 3. Alternately rotating RV4 and RV8, adjust the the pedestal level and white peak.	TP2(N-1)  DC 500 mV/DIV 10 μs/DIV A = Minimum B = 1.8 ± 0.02 Vp-p	RV8(L-3) RV3(N-3) RV4(N-2) TRIG : CH-1

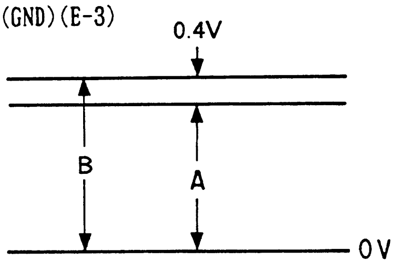
5 - 16. B Level (A/D IN) Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. • Input select = R.G.B • Input signal = 5 stair steps (TSG-300) 2. Adjust the pedestal level to 0V DC using RV7 and minimize A using RV1. 3. Alternately rotating RV6 and RV7, adjust the the pedestal level and white peak.	TP3(N-1)  DC 500 mV/DIV 10 μs/DIV A = Minimum B = 1.8 ± 0.02 Vp-p	RV7(L-3) RV1(M-3) RV6(M-3) TRIG : CH-1

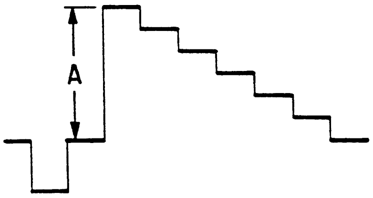
5 - 17. R.G.B Balance Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. • Input select = R.G.B • Input signal = 5 stair steps (TSG-300) 2. Connect the oscilloscope to TP2, set its range to 200mV/div , and adjust the pedestal level to 0V DC using RV8. 3. Align the cursor with the third step of the 5-stair step. 4. Connect the oscilloscope to TP1 and align both the 0V line and the third step of the stair step with the cursor using RV2 and RV9. 5. Connect the oscilloscope to TP3 and align both the 0V line and the third step of the stair step with the cursor using RV6 and RV7.	TP2(N-1) TP1(P-1) TP3(N-1) 	RV8(L-3) RV2(M-3) RV9(M-3) RV6(M-3) RV7(L-3) TRIG : CH-1

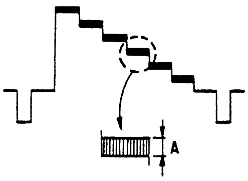
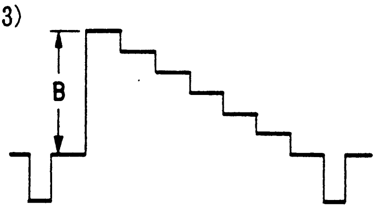
5 - 18. ACK Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = COMPOSITE (1410) 2. Measure DC level at TP329, and coincide a cursole to there. 3. Coincide another cursole under 0.4V than B. 4. Adjust RV317 so that DC level at TP331 becomes to lower cursole.	TP329(E-3) TP331(D-2) E1005(GND)(E-3)  A = B-0.4V ± 0.05V	RV317(E-2) TRIG : CH-1

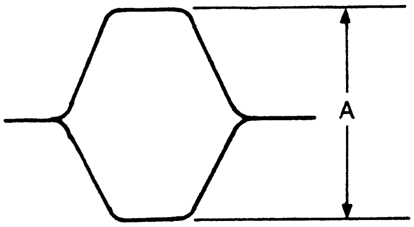
5 - 19. B/W Y Level Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = COMPOSITE (1410) Burst = OFF	TP323(F-3) E305(GND)(F-1)  A = 684mV ± 20mV	RV318(H-6) TRIG : CH-1

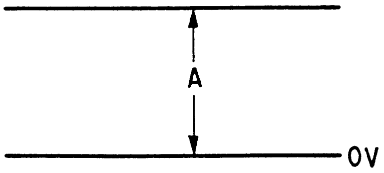
5 - 20. Y/C SEP Y Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = COMPOSITE (1410) 2. Minimize A using LV301 and RV302. 3. Adjust B to the specification using RV316.	TP303(L-5)  set the oscilloscope to 20MHz filter IN. A = Minimum (less than 0.05 Vp-p) TP323(G-3)  B = 684mV ± 20mV	LV301(H-6) RV302(J-6) RV316(L-5)・・・B TRIG : CH-1

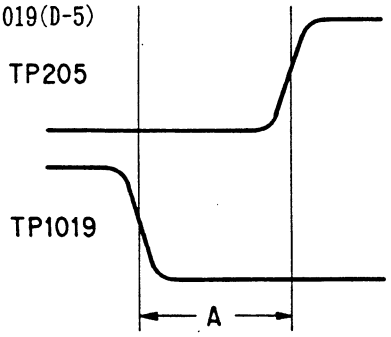
5 - 21. Y/C SEP C Adjustment(VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = COMPOSITE (1410) 2. Adjustment A for maximum.	TP321(G-3)  A = 130mV ± 30mVp-p	TI301(H-5)

5 - 22. AGC Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = COMPOSITE (1410) 2. Set the AGC switch (DSC-9 board) on the front panel to AUTO. 3. Turn ON/OFF the VIDEO 75Ω switch on the rear panel. 4. Repeat Step 3. until the specification is obtained. 5. After adjustment, AGC switch = MANUAL 75Ω switch = ON	TP4(M-1) E1(GND)(N-3)  A = 1.8 ± 0.02 V (75Ω ON)・・・(1) A = 2.75± 0.05 V (75Ω OFF) ・・(2)	RV15(K-1) = 75Ω ON(1) RV14(L-2) = 75Ω OFF(2) TRIG : CH-1

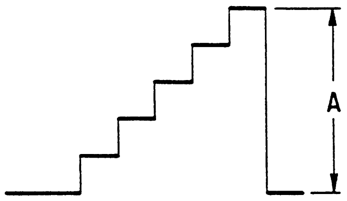
5 - 23. AFC Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = COMPOSITE (1410)	TP205(F-5) TP1019(D-5)  A = 240 ± 10 ns	LV1004(C-7) TRIG : CH-1

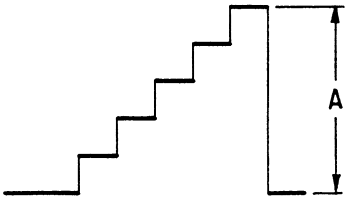
5 - 24. Display IC Clock Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. No signal. 2. Adjust using the frequency counter.	TP1028(B-2) E1003(GND)(C-2) 6.0MHz ± 2KHz	CV1002(C-2) TRIG : CH-1

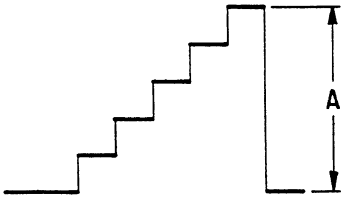
5 - 25. R Level (ENC IN) Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = R.G.B.(COMPONENT) (TSG-300 : 5-stair step) 2. Set the R volume (DSC-8 board) on the rear panel to the center click position.	TP1001(B-3) E1001(GND)(B-3)  A = 1 ± 0.02 V	RV1001(B-2) TRIG : CH-1

5 - 26. G Level (ENC IN) Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = R.G.B. (COMPONENT) (TSG-300 : 5-stair step) 2. Set the G volume (DSC-8 board) on the rear panel to the center click position.	TP1002(A-2) E1001(GND)(B-3)  A = 1 ± 0.02 V	RV1002(A-2) TRIG : CH-1

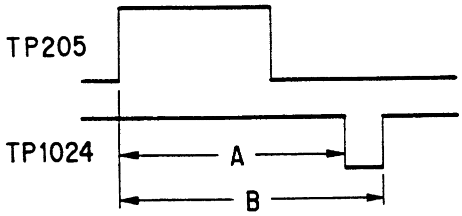
5 - 27. B Level (ENC IN) Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = R.G.B. (COMPONENT) (TSG-300 : 5-stair step) 2. Set the B volume (DSC-8 board) on the rear panel to the center click position.	TP1003(A-2) E1001(GND)(B-3)  A = 1 ± 0.02 V	RV1003(A-2) TRIG : CH-1

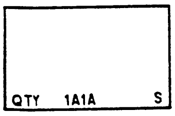
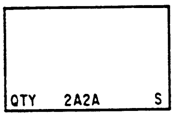
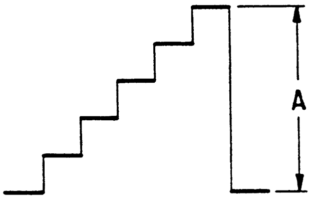
5 - 28. Sync Generator Clock Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. No signal. 2. Adjust using the frequency counter.	TP1027(C-4) E1001(GND)(B-3) 14.31818 MHz ± 50Hz	CV1001(C-4) TRIG : CH-1

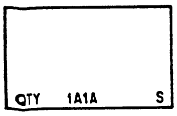
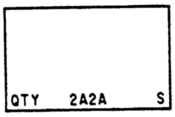
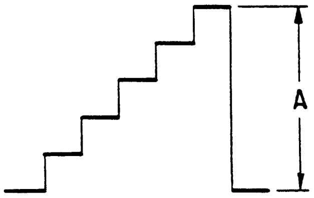
5 - 29. Burst Flag Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO	TP205(F-5) = CH-1 TP1024(C-3) = CH-2  A = 5.6 ± 0.1 μs ・・・(1) B = 8.1 ± 0.1 μs ・・・(2)	RV1007(C-3) (1) RV1008(C-3) (2)

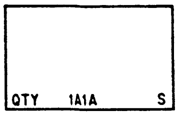
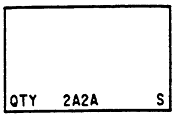
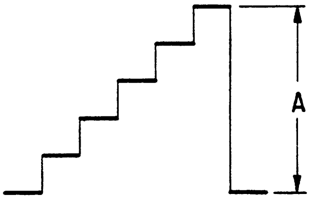
5 - 30. R OUT Level Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = R.G.B(COMPONENT) Input signal = 5-stair step (TSG-300) 2. Terminate the R OUT on the rear panel in 75 Ω and connect the oscilloscope. 3. Set the monitor screen as shown in the figure below.  UP-5100  UP-5150	 A = 700mV ± 20mV	RV1009(A-6) TRIG : CH-1

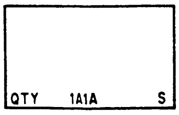
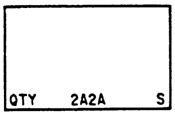
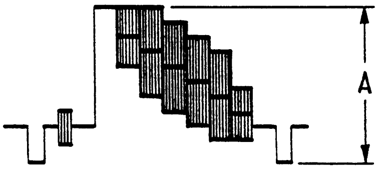
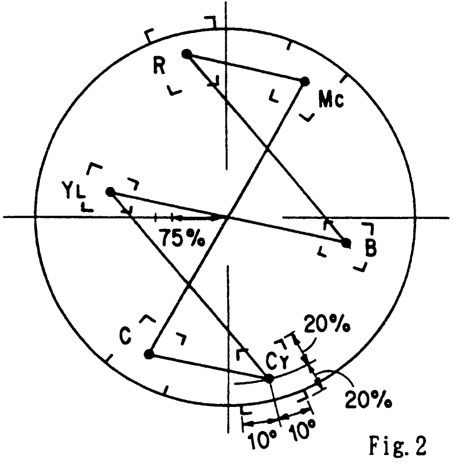
5 - 31. G OUT Level Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = R.G.B(COMPONENT) Input signal = 5-stair step (TSG-300) 2. Terminate the G OUT on the rear panel in 75 Ω and connect the oscilloscope. 3. Set the monitor screen as shown in the figure below.  UP-5100  UP-5150	 A = 700mV ± 20mV	RV1010(A-6) TRIG : CH-1

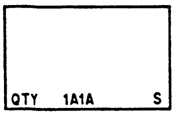
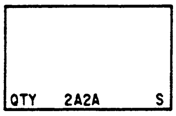
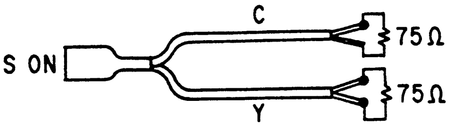
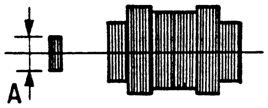
5 - 32. B OUT Level Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = R.G.B(COMPONENT) Input signal = 5-stair step (TSG-300) 2. Terminate the B OUT on the rear panel in 75 Ω and connect the oscilloscope. 3. Set the monitor screen as shown in the figure below.  UP-5100  UP-5150	 A = 700mV ± 20mV	RV1011(A-6) TRIG : CH-1

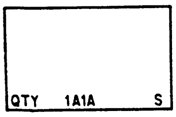
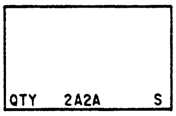
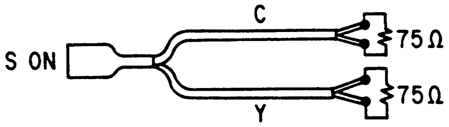
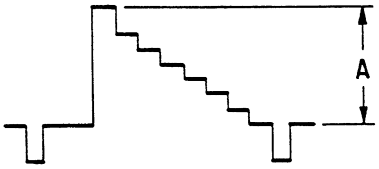
5 - 33. VIDEO OUT Level Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = COMPOSITE Input signal = COLOR BAR (1410) 2. Set the monitor screen as shown in the figure below.  UP-5100  UP-5150 3. Adjust using RV1012 so that the oscilloscope display matches Fig1. 4. Adjust using the two coils of TI301 so that the vectorscope display matches Fig 2.	 A = 1.0 ± 0.1 Vp-p Fig. 1 Vectorscope  R Mc YL B 75% C CY 20% 20% 10° 10° Fig. 2	RV1012(B-6) TI301(H-5) TRIG : CH-1

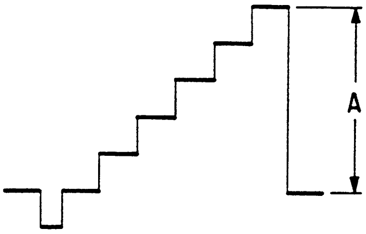
5 - 34. Burst Level (S-VIDEO) Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO Input signal = 75% COLOR BAR (TSG-130) 2. Set the monitor screen as shown in the figure below.  UP-5100  UP-5150 3. Terminate the S-VIDEO output (C-OUT) on the rear panel in 75 Ω and connect the oscilloscope. (Make a jig such as that shown in Fig. right.) 4. Adjust using RV1005 so that the burst level of the chroma signal meets the specification. (Fig. 2)	  A = 286mV ± 20mV	RV1005(B-7) TRIG : CH-1

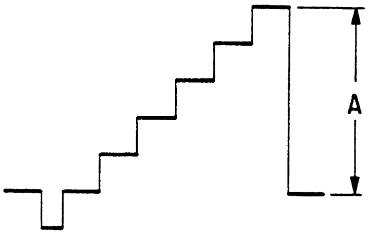
5 - 35. Y Level (S-VIDEO) Adjustment (VA-26 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = S-VIDEO Input signal = 75% COLOR BAR (TSG-130) 2. Set the monitor screen as shown in the figure below.  UP-5100  UP-5150 3. Terminate the S-VIDEO output (Y-OUT) on the rear panel in 75 Ω and connect the oscilloscope. (Make a jig such as that shown in Fig. right.) 4. Adjust using RV1006 so that the level from the pedestal to the white peak of the Y signal meets the specification. (Fig. 2)	  A = 714mV ± 20mV	RV1006(C-7) TRIG : CH-1

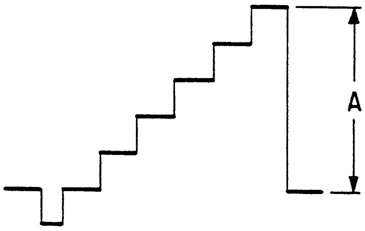
5 - 36. R OUT (Through) Level Adjustment (IF-19 Board)

Condition When Adjustment	Specification	Adjusting Point
1. Input select = R.G.B(COMPONENT) Input signal = 5-stair step (TSG-300) 2. Set the unit to THROUGH. 3. Terminate the R OUT on the rear panel in 75 Ω and connect the oscilloscope.	 A = 700mV ± 20mV	RV401(B-1) TRIG : CH-1

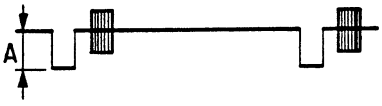
5 - 37. G OUT(Through) Level Adjustment (IF-19 Board)

Condition When Adjusting	Specification	Adjusting Point
1. Input select = R.G.B(COMPONENT) Input signal = 5-Stair steps (TSG-300) 2. Set the unit to THROUGH. 3. Terminate the G OUT on the rear panel in 75 Ω and connect the oscilloscope.	 A = 700mV ± 20mV	RV501(C-1)

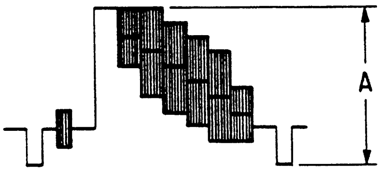
5 - 38. B OUT(Through) Level Adjustment (IF-19 Board)

Condition When Adjusting	Specification	Adjusting Point
1. Input select = R.G.B(COMPONENT) Input signal = 5-Stair steps (TSG-300) 2. Set the unit to THROUGH. 3. Terminate the B OUT on the rear panel in 75 Ω and connect the oscilloscope.	 A = 700mV ± 20mV	RV601(D-1)

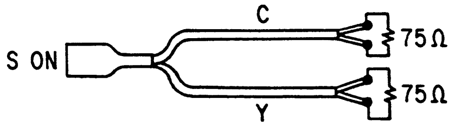
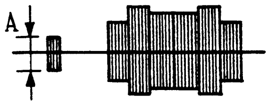
5 - 39. SYNC Level (Through) Adjustment (IF-19 Board)

Condition When Adjusting	Specification	Adjusting Point
1. Input select = VIDEO Input signal = BLACK BURST(1410) 2. Terminate the SYNC OUT on the rear panel in 75 Ω and connect the oscilloscope.	 A = 286mV ± 20mV	RV701(E-1)

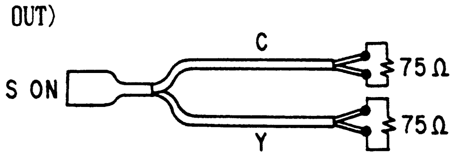
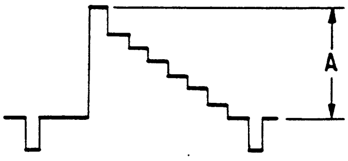
5 - 40. VIDEO OUT(Through) Level Adjustment (IF-19 Board)

Condition When Adjusting	Specification	Adjusting Point
1. Input select = COMPOSITE Input signal = 75% COLOR BAR(1410) 2. Set the AGC switch (DSC-9 board) on the front panel to AUTO. 3. After adjustment , set the AGC switch back to MANUAL.	VIDEO OUT (Rear panel)  A = 1.0 ± 0.1Vp-p	RV301(H-1) TRIG : CH-1

5 - 41. Burst Level (S-VIDEO) Through Adjustment (IF-19 Board)

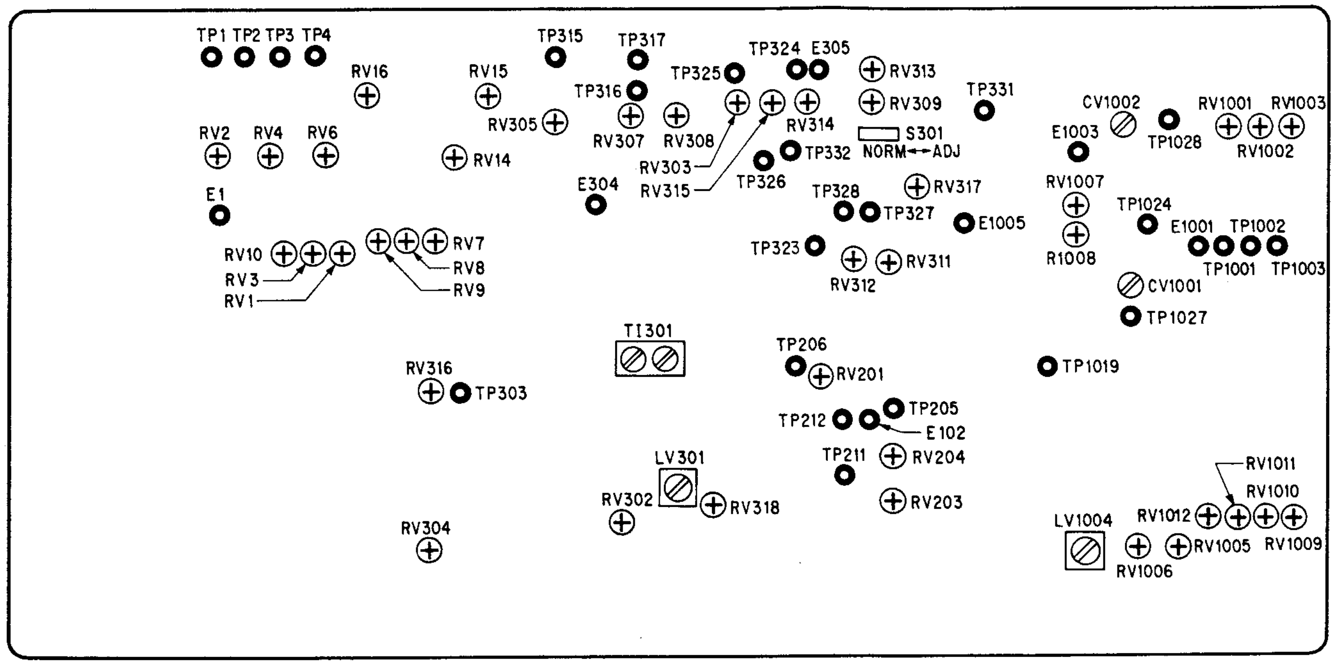
Condition When Adjusting	Specification	Adjusting Point
1. Input select = S-VIDEO Input signal = 75% COLOR BAR (TSG-130) 2. Terminate the S-VIDEO output (C-OUT) on the rear panel in 75Ω and connect the oscilloscope. (Make a jig such as that shown in Fig. right.) 3. Adjust using RV101 so that the burst level of the chroma signal meets the specification.	S-VIDEO OUT (Rear panel) (C OUT)   A = 286mV ± 20mV	RV101(F-1) TRIG : CH-1

5 - 42. Y Level (S-VIDEO) Through Adjustment (IF-19 Board)

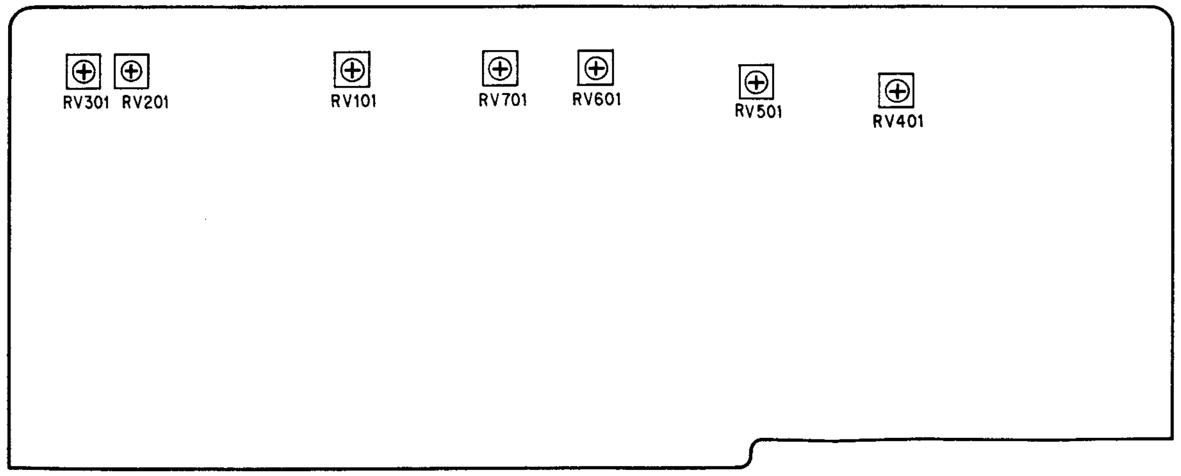
Condition When Adjusting	Specification	Adjusting Point
1. Input select = S-VIDEO Input signal = 75% COLOR BAR (TSG-130) 2. Terminate the S-VIDEO output (Y-OUT) on the rear panel in 75Ω and connect the oscilloscope. (Make a jig such as that shown in Fig. right.) 3. Adjust using RV201 so that the burst level of the chroma signal meets the specification.	S-VIDEO OUT (Rear panel) (Y OUT)   A = 714mV ± 20mV	RV201(H-1) TRIG : CH-1

5-43. ADJUSTMENT ELEMENT LOCATION

VA-26 Board (Component Side)


TP1
TP2
TP3
TP4
RV16
RV15
TP315
TP317
TP316
TP325
TP324
E305
RV313
RV309
TP331
RV305
RV307
RV308
RV314
S301
NORM←→ADJ
TP332
RV303
RV315
TP326
RV2
RV4
RV6
RV14
E304
TP328
TP327
RV317
E1005
E1
RV10
RV3
RV1
RV7
RV8
RV9
TP323
RV312
RV311
CV1002
E1003
TP1028
RV1001
RV1003
RV1002
RV1007
R1008
TP1024
E1001
TP1002
TP1001
TP1003
CV1001
TP1027
TI301
TP206
RV201
RV316
TP303
TP1019
TP212
TP205
E102
TP211
RV204
LV301
RV302
RV318
RV203
RV304
RV1011
RV1010
LV1004
RV1012
RV1005
RV1009
RV1006

IF-19 Board (Component Side)


RV301
RV201
RV101
RV701
RV601
RV501
RV401

SECTION 6
EXPLODED VIEWS

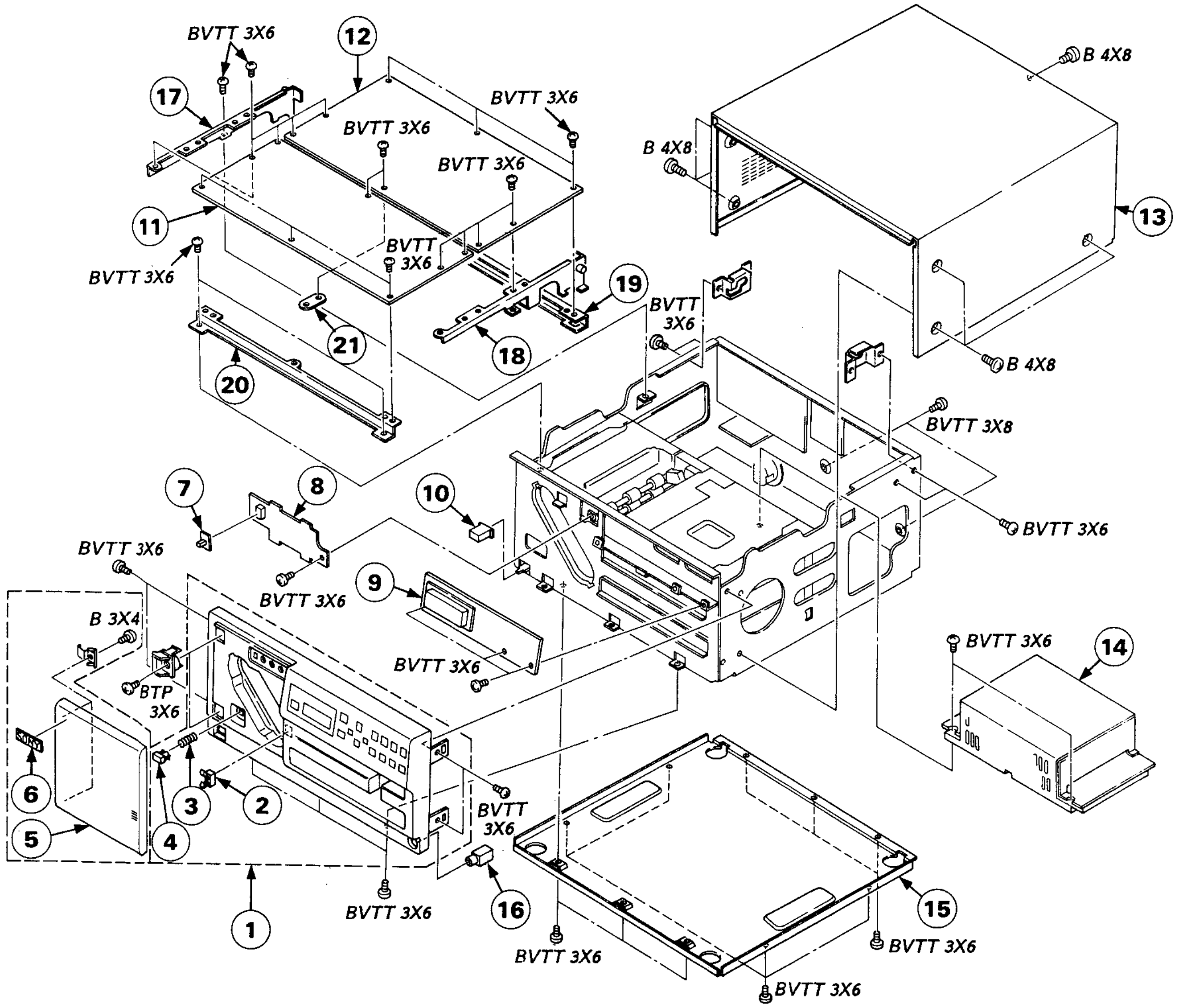
NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

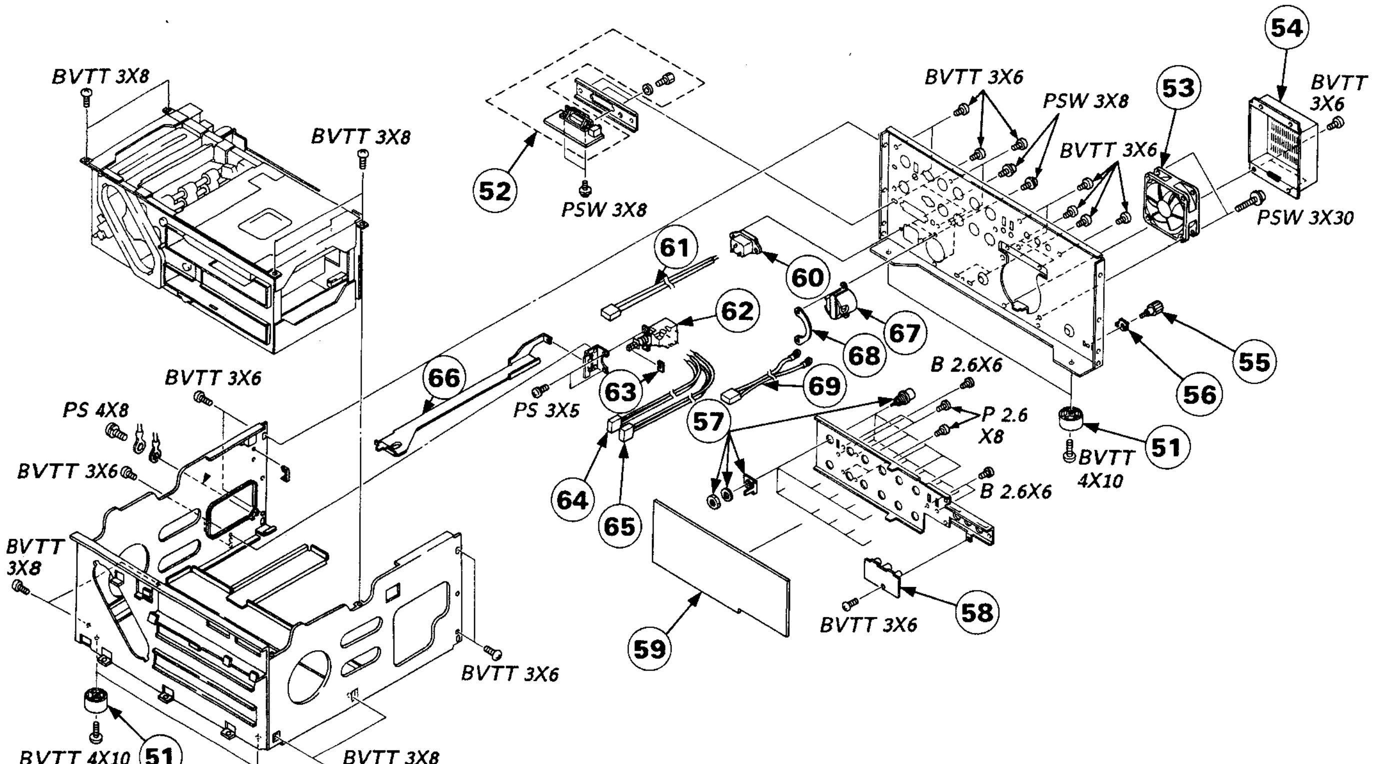
Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

6-1. CABINET


BVTT 3X6
12
17
BVTT 3X6
BVTT 3X6
BVTT 3X6
B 4X8
B 4X8
13
11
BVTT 3X6
BVTT 3X6
19
BVTT 3X6
21
18
20
B 4X8
BVTT 3X8
7
8
10
BVTT 3X6
BVTT 3X6
9
BVTT 3X6
BVTT 3X6
B 3X4
BTP 3X6
BVTT 3X6
14
6
3
2
5
4
BVTT 3X6
BVTT 3X6
16
15
1
BVTT 3X6
BVTT 3X6
BVTT 3X6

Ref.No	Part No.	Description	Remark
1	*A-8266-077-A	(5100) PANEL ASSY, FRONT	Incl. 2-4
1	*A-8266-078-A	(5150) PANEL ASSY, FRONT	Incl. 2-4
2	4-392-036-01	CATCH, PUSH	
3	4-864-519-02	SPRING, COMPRESSION	
4	3-725-631-01	BUTTON, CARTRIDGE	
5	A-8266-081-A	DOOR ASSY, RIBBON	
6	3-718-322-02	EMBLEM, SONY	
7	3-725-635-01	KNOB (AGC), SLIDE	
8	*A-8276-144-A	MOUNTED PCB, DSC-8	
9	*A-8276-147-A	MOUNTED PCB, KY-12	
10	2-431-568-31	BUTTON, POWER	
11	*A-8271-104-A	(5100) FMY-8 BOARD, COMPLETE	
11	*A-8271-105-A	(5150) FMY-8 BOARD, COMPLETE	
12	*A-8271-106-A	VA-26 BOARD, COMPLETE	
13	*3-173-857-01	CASE, UPPER	
14	⚠ *1-413-688-11	REGULATOR, SWITCHING (VTR-P3A)	
15	*3-725-637-03	PLATE, BOTTOM	
16	1-507-195-21	SPECIAL REMOTE CONTROL JACK	
17	*X-3166-421-1	BRACKET (L) ASSY, PC BOARD	
18	*X-3166-420-1	BRACKET (R) ASSY, PC BOARD	
19	*3-173-082-02	BRACKET, PC BOARD SUPPORT	
20	*3-173-081-01	BRACKET (B), PC BOARD	
21	*3-173-858-01	JOINT	

6-2. CHASSIS

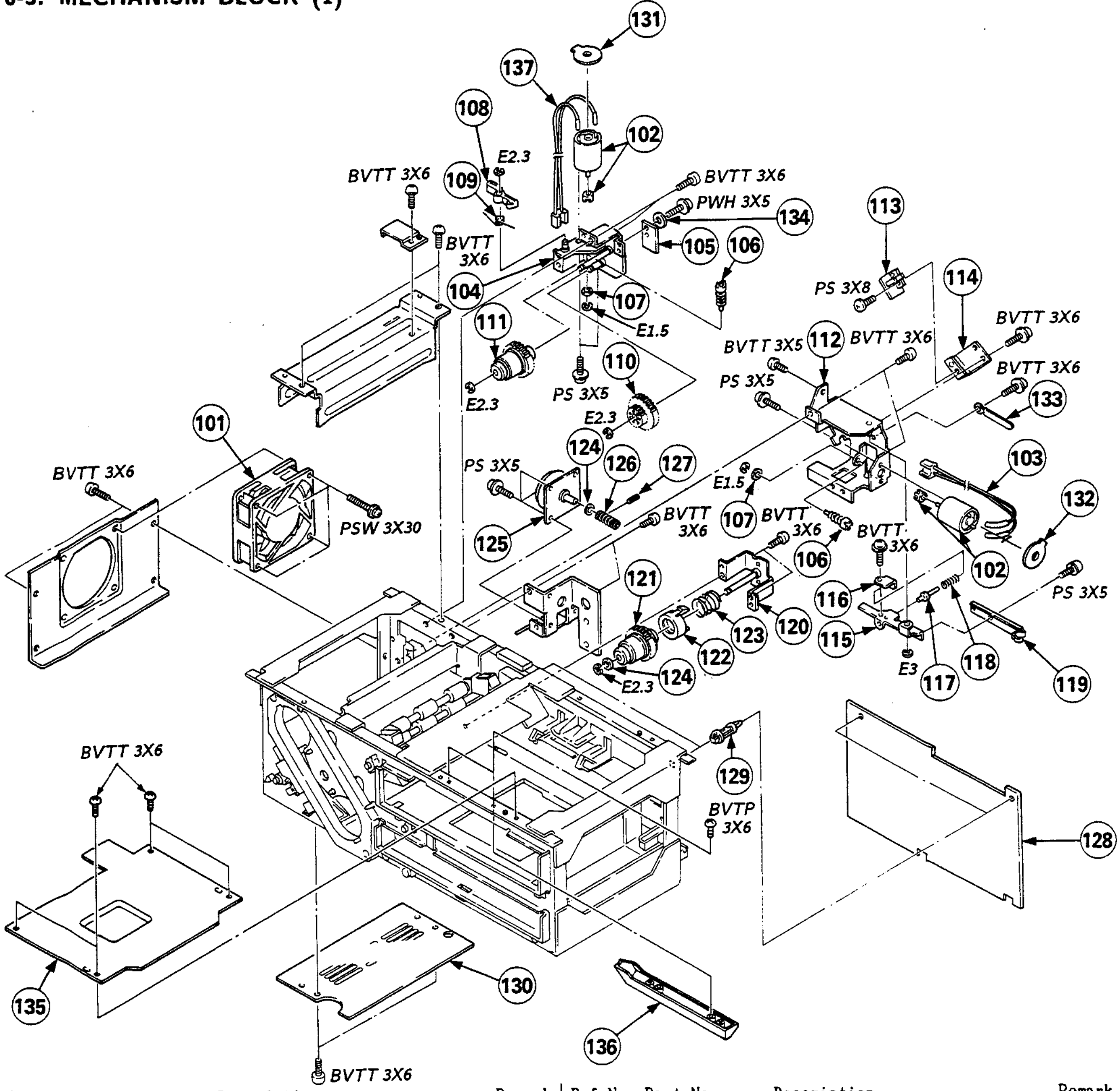

BVTT 3X8
BVTT 3X8
52
PSW 3X8
BVTT 3X6
PSW 3X8
BVTT 3X6
53
54
BVTT 3X6
PSW 3X30
61
60
62
67
68
69
66
63
BVTT 3X6
PS 4X8
PS 3X5
B 2.6X6
P 2.6 X8
B 2.6X6
55
56
51
BVTT 4X10
57
64
65
BVTT 3X6
BVTT 3X8
BVTT 3X6
59
58
BVTT 3X6
BVTT 4X10
51
BVTT 3X8

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

Ref.No	Part No.	Description	Remark
51	X-3316-715-1	FOOT ASSY	
52	*A-8276-145-A	MOUNTED PCB, IF-21	
53	1-541-593-22	MOTOR, DC FAN	
54	*3-173-085-01	COVER, FAN	
55	X-2068-004-0	TERMINAL ASSY	
56	2-068-008-00	WASHER	
57	1-562-227-21	RECEPTACLE, BNC	
58	*A-8276-146-A	MOUNTED PCB, DSC-9	
59	*A-8271-103-A	IF-19 BOARD, COMPLETE	
60	⚠ 1-580-375-11	INLET 3P	
61	⚠ *1-949-387-11	HARNESS (AC(IN))	
62	⚠ 1-554-880-11	SWITCH, PUSH (AC POWER)(1 KEY)	
63	3-725-616-01	STOPPER, ROD	
64	⚠ *1-949-385-11	HARNESS (AC(SW1))	
65	⚠ *1-949-386-11	HARNESS (AC(SW2))	
66	*3-173-092-01	PLATE, LOD, SW	
67	⚠ 1-509-841-00	CONNECTOR, AC OUTLET	
68	*3-651-491-00	NUT, PLATE (AC)	
69	⚠ *1-940-905-12	HARNESS, AC (OUT)	

6-3. MECHANISM BLOCK (1)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PWH 3X5
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BVTT 3X6
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PS 3X8
114
107
E1.5
111
BVTT 3X5
112
BVTT 3X6
BVTT 3X6
110
PS 3X5
BVTT 3X6
E2.3
PS 3X5
133
E2.3
101
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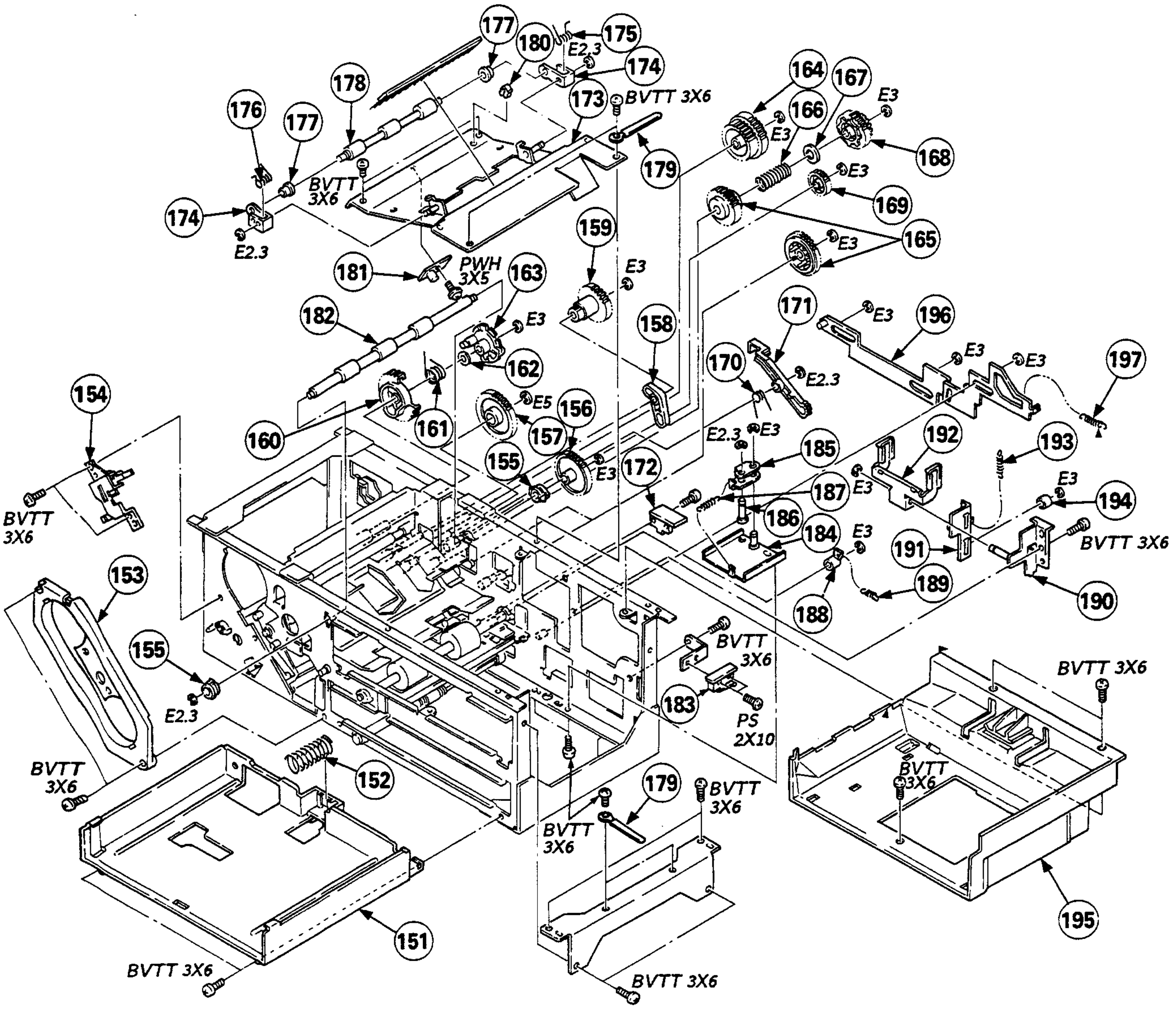
126
127
103
BVTT 3X6
PS 3X5
E1.5
132
PSW 3X30
BVTT 3X6
107
BVTT 3X6
BVTT 3X6
125
106
102
121
116
PS 3X5
123
120
122
115
118
124
E2.3
E3
117
119
BVTT 3X6
129
BVTP 3X6
128
135
130
136
BVTT 3X6

Ref.No	Part No.	Description	Remark
101	1-541-593-22	MOTOR. DC FAN (M904)	
102	A-8262-092-A	MOTOR ASSY. DC	
103	*1-949-368-11	HARNESS B(HM)	
104	*X-3725-621-1	BRACKET ASSY. TAKE-UP BLOCK	
105	*A-8276-142-A	MOUNTED PCB. SW-30	
106	X-3725-616-1	WORM ASSY	
107	3-701-437-21	WASHER	
108	3-725-772-01	LEVER. EJECT	
109	3-725-773-01	SPRING	
110	3-725-771-01	GEAR. LIMITER IDLER	
111	A-8262-090-A	LIMITER (A) BLOCK ASSY	
112	*X-3725-627-1	PLATE ASSY. CAM. HEAD	
113	*A-8276-140-A	MOUNTED PCB. SW-31	
114	*3-725-757-01	BRACKET. CAM SENSOR	
115	*3-725-750-01	LEVER (A). GEAR SHIFT	
116	*3-725-751-01	BRACKET. SHIFT LEVER	
117	*3-725-752-02	SHAFT. GEAR SHIFT CAM	
118	3-641-622-00	SPRING. COMPRESSION	
119	*3-725-806-01	LEVER (B). GEAR SHIFT	
120	*X-3725-617-1	BRACKET ASSY. BRAKE	
121	A-8262-088-A	LIMITER (B) BLOCK ASSY	
122	3-725-758-01	HOUSING. SPRING	
123	3-725-759-01	SPRING. COMPRESSION	
124	3-701-439-11	WASHER	
125	1-541-594-11	MOTOR. STEPPING (M901)	
126	3-725-807-01	GEAR. WORM	
127	3-701-505-00	SET SCREW. DOUBLE POINT 3X3	
128	*A-8271-102-A	(5100) SY-9 BOARD. COMPLETE	
128	*A-8271-113-A	(5150) SY-9 BOARD. COMPLETE(2)	
129	*4-914-008-01	HOLDER. PCB	
130	*3-725-827-01	REINFORCEMENT (E)	
131	*1-641-669-11	SU-4 BOARD	
132	*1-641-670-11	SU-5 BOARD	
133	*3-701-822-00	HOLDER. WIRE	
134	3-701-439-41	WASHER	
135	*3-173-087-01	PLATE. SHIELD. MECHANICAL	
136	*3-173-088-01	GUIDE. SUB	
137	*1-949-367-11	HARNESS A (RM)	

6-4. MEHCANISM BLOCK (2)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3X6
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E3
169
174
E2.3
159
165
E3
181
PWH
3X5
163
E3
171
E3
196
E3
E3
197
182
E3
158
162
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E2.3
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E5
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157
E2.3
E3
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E3
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E3
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E3
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BVTT
3X6
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E3
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BVTT 3X6
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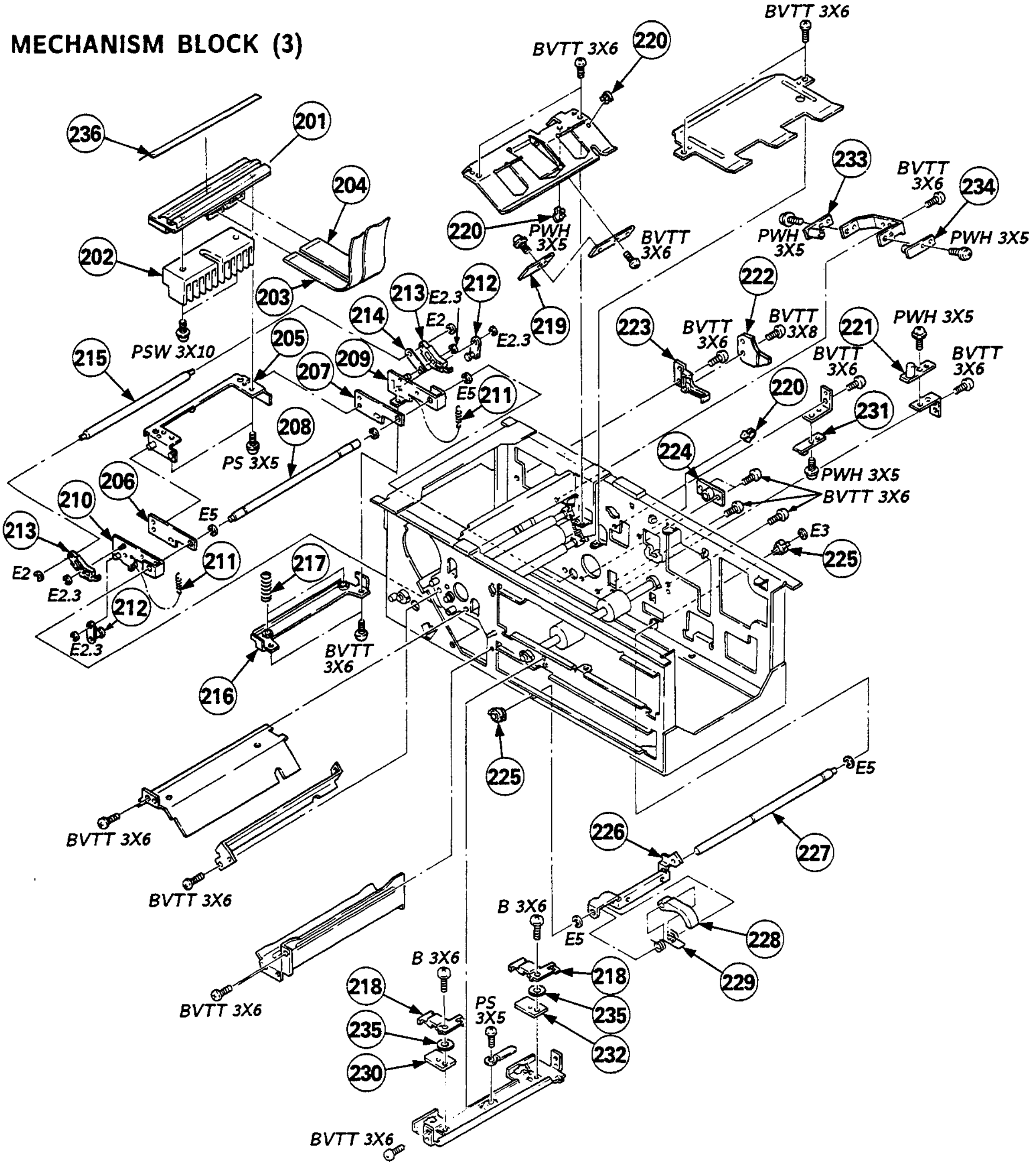
189
190
188
BVTT
3X6
155
BVTT 3X6
E2.3
183
PS
2X10
BVTT
3X6
BVTT
3X6
152
179
BVTT
3X6
BVTT
3X6
195
151
BVTT 3X6
BVTT 3X6

Ref.No	Part No.	Description	Remark
151	*3-725-661-12	RETAINER, TRAY	
152	3-725-662-01	SPRING, COMPRESSION	
153	*3-725-640-11	GUIDE, CARTRIDGE ENTRANCE	
154	*A-8262-078-A	LOCK ASSY, CARTRIDGE	
155	3-725-696-01	BEARING (2)	
156	3-725-649-01	GEAR	
157	3-725-655-01	GEAR, PLATEN	
158	3-725-811-01	LEVER, CAM	
159	3-725-658-01	WHEEL, WORM, HEAD	
160	3-725-656-01	GEAR, HEAD CAM	
161	3-725-808-01	SPRING, TORSION	
162	3-701-444-11	WASHER, 6	
163	3-725-657-01	CAM, HEAD	
164	3-725-654-01	WHEEL, WORM	
165	3-725-650-01	GEAR, IDLER	
166	3-725-652-01	SPRING, COMPRESSION	
167	3-701-446-21	WASHER, 8	
168	3-725-653-01	GEAR, SHIFT	
169	3-725-651-01	GEAR, SMALL	
170	3-725-664-01	SPRING, TORSION	
171	3-725-663-01	ARM, BRAKE	
172	*A-8276-143-A	MOUNTED PCB, SW-35	
173	*X-3725-612-1	GUIDE BLOCK ASSY	
174	*3-725-734-01	ARM, ROLLER	
175	3-725-735-01	SPRING, TORSION	
176	3-725-736-01	SPRING, TORSION	
177	3-725-683-01	BEARING, ROLLER	
178	3-725-737-01	ROLLER (UPPER)	
179	*3-701-822-00	HOLDER, WIRE	
180	3-660-815-00	CLIP, CABLE	
181	*A-8276-138-A	MOUNTED PCB, PTC-3	
182	3-725-648-01	ROLLER (LOWER)	
183	*A-8276-137-A	MOUNTED PCB, S-8	
184	*X-3725-610-1	BRACKET ASSY, LOCK BLOCK	
185	*3-725-723-01	PLATE, LOCK	
186	*3-725-724-01	SHAFT, LOCK	
187	3-725-725-01	SPRING, TENSION	
188	3-725-659-01	LEVER, REVERSE PREVENTION	
189	3-725-666-01	SPRING, TENSION	
190	*X-3725-613-1	BRACKET ASSY	
191	*X-3725-614-1	LEVER ASSY, MIDWAY	
192	*X-3725-615-1	PLATE ASSY	
193	3-725-741-01	SPRING, TENSION	
194	3-725-740-01	ROLLER	
195	*3-725-820-11	RETAINER, TRAY	
196	*X-3725-603-1	JOINT ASSY	
197	3-725-669-01	SPRING, TENSION	

6-5. MECHANISM BLOCK (3)



BVTT 3X6
BVTT 3X6
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236
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203
PSW 3X10
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PWH 3X5
BVTT 3X6
219
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BVTT 3X6
234
PWH 3X5
PWH 3X5
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E2.3
212
E2
E2.3
214
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209
207
E5
211
223
BVTT 3X6
BVTT 3X8
221
PWH 3X5
BVTT 3X6
BVTT 3X6
220
231
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PS 3X5
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210
224
PWH 3X5
BVTT 3X6
213
E5
E2
E2.3
211
212
E2.3
217
BVTT 3X6
216
E3
225
225
E5
226
227
BVTT 3X6
BVTT 3X6
B 3X6
E5
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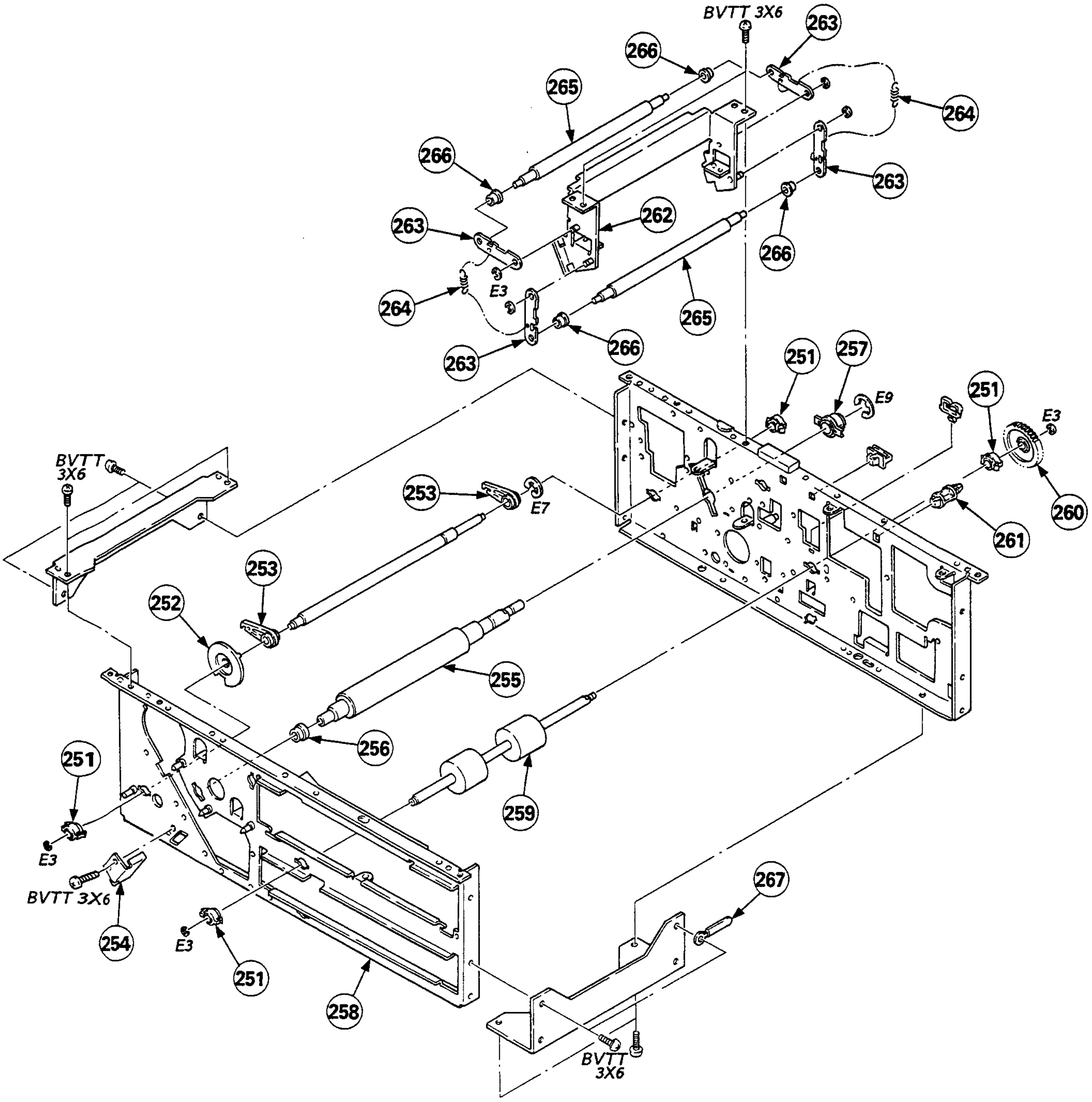
229
B 3X6
218
218
235
PS 3X5
235
232
230
BVTT 3X6
BVTT 3X6

Ref.No	Part No.	Description	Remark
201	1-543-881-12	HEAD, THERMAL (TH55212)	
202	*3-725-812-01	FIN, HEAD	
203	*1-690-502-11	WIRE, FLAT TYPE (10 CORE)	
204	*1-559-969-11	WIRE, FLAT TYPE (16 CORE)	
205	*X-3725-605-1	STAY ASSY, HEAD	
206	*3-725-692-01	ARM (A) (RIGHT), HEAD	
207	*3-725-693-01	ARM (A) (LEFT), HEAD	
208	*3-725-694-01	SHAFT, HEAD ARM	
209	*X-3725-606-1	ARM (B) (LEFT) BLOCK ASSY, HEAD	
210	*X-3725-608-1	ARM (B) (RIGHT)BLOCK ASSY, HEAD	
211	3-725-702-01	SPRING, TENSION	
212	*X-3725-607-1	ARM (B) BLOCK ASSY, HEAD U/D	
213	3-725-701-01	ARM, RIBBON ROLLER	
214	3-725-834-01	BRACKET, ROLLER GROUND	
215	*3-725-690-01	ROLLER, RIBBON	
216	*3-725-691-01	PRESSER, HEAD	
217	3-725-695-01	SPRING, COMPRESSION	
218	*3-725-720-01	COVER, PC BOARD	
219	*A-8276-129-A	MOUNTED PCB, PTC-4	
220	3-660-815-00	CLIP, CABLE	
221	*A-8276-131-A	MOUNTED PCB, PTC-25	
222	*A-8276-134-A	MOUNTED PCB, SW-32	
223	3-725-718-01	BRACKET (C), SENSOR	
224	3-725-660-01	BEARING, HEAD SHAFT	
225	3-725-696-01	BEARING (2)	
226	*X-3725-609-1	BRACKET ASSY	
227	*3-725-709-01	SHAFT	
228	3-725-710-02	LEVER	
229	3-725-711-01	SPRING (A), TORSION	
230	*A-8276-135-A	MOUNTED PCB, SW-36	
231	*A-8276-130-A	MOUNTED PCB, PTC-26	
232	*A-8276-136-A	MOUNTED PCB, SW-37	
233	*A-8276-133-A	MOUNTED PCB, PTC-23	
234	*A-8276-132-A	MOUNTED PCB, PTC-24	
235	3-701-439-41	WASHER	
236	3-174-628-01	COVER, HEAD	

6-6. MECHANISM BLOCK (4)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263
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E3
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263
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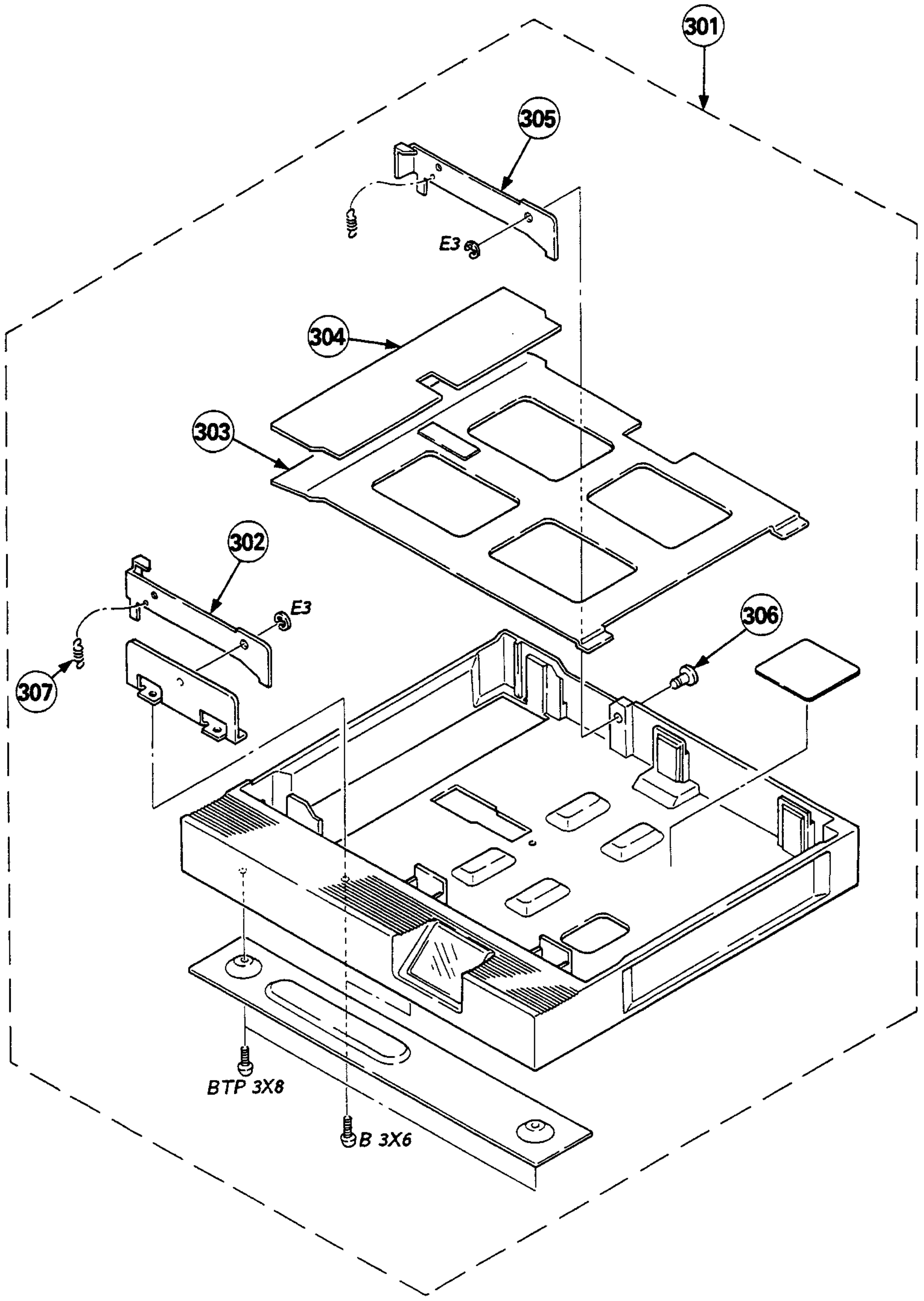
251
257
E9
251
E3
260
261
BVTT 3X6
253
E7
253
252
255
256
259
251
E3
BVTT 3X6
254
E3
251
258
267
BVTT 3X6

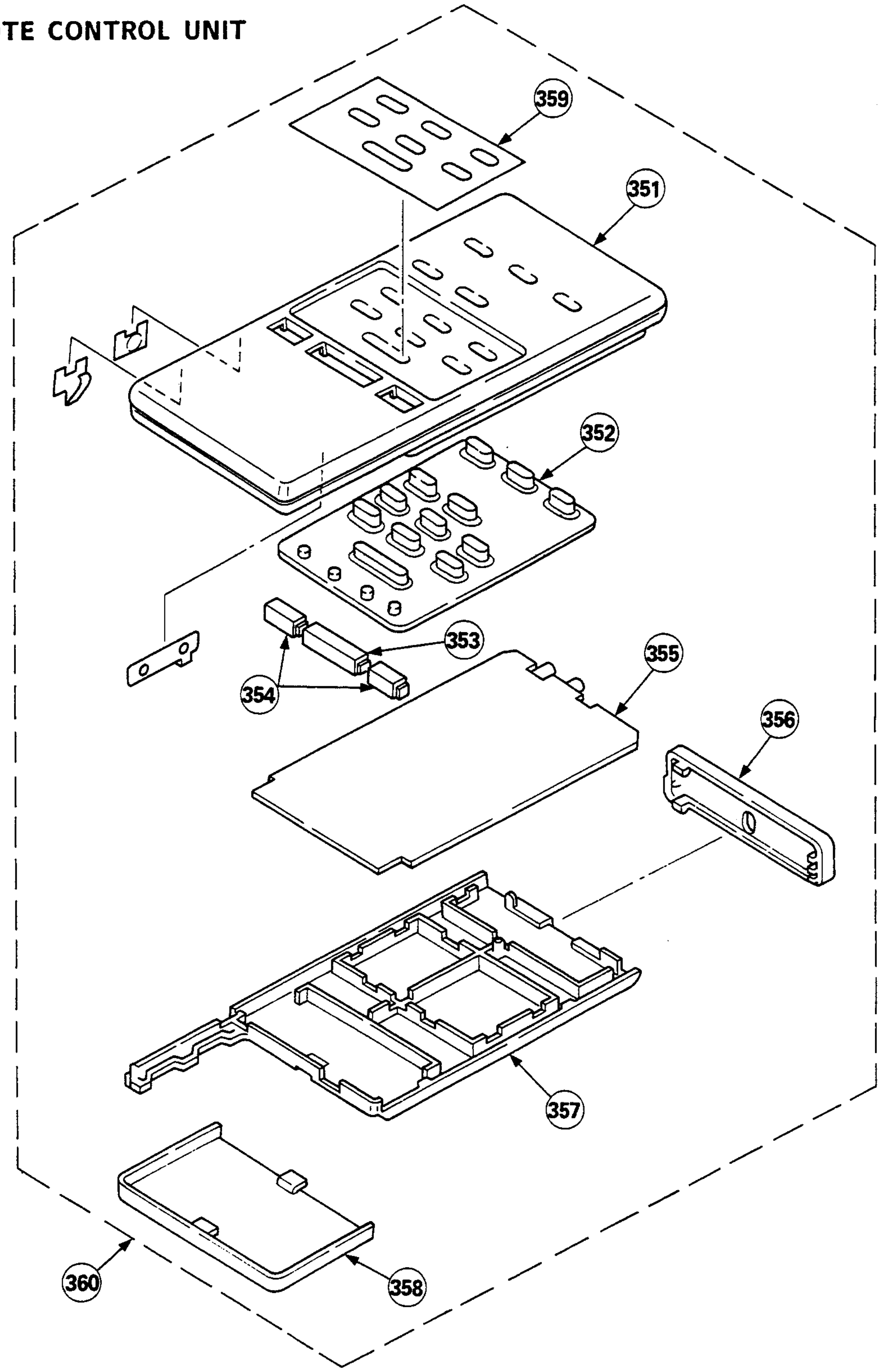
Ref.No	Part No.	Description	Remark
251	3-725-696-01	BEARING (2)	
252	3-725-689-01	STOPPER, EJECT	
253	3-725-688-01	ARM (A), HEAD U/D	
254	*3-725-668-01	STOPPER, HEAD	
255	3-725-646-05	PLATEN	
256	3-725-823-01	BEARING (3)	
257	3-725-697-01	BEARING (1)	
258	*X-3725-629-3	CHASSIS (FRONT)ASSY, MECHANICAL	
259	3-725-647-01	ROLLER	
260	3-725-698-01	GEAR	
261	*4-332-236-00	SUPPORT, HEAT SINK	
262	*X-3725-604-1	BRACKET ASSY, PINCH ROLLER ARM	
263	*3-725-682-01	ARM, PINCH ROLLER	
264	*3-437-282-00	SPRING, COMPRESSION	
265	*3-725-684-01	PINCH ROLLER	
266	3-172-911-01	BEARING (M), ROLLER	
267	*3-701-822-00	HOLDER, WIRE	

6-7. TRAY ASSEMBLY


301
305
E3
304
303
302
E3
306
307
BTP 3X8
B 3X6

Ref.No	Part No.	Description	Remark
301	A-8261-250-A	TRAY ASSY (W)	302-307
302	*3-725-787-01	CLAW (LEFT)	
303	*3-725-785-01	PLATE	
304	*3-725-790-01	SHEET, LEATHER	
305	*3-725-786-01	CLAW (RIGHT)	
306	*3-725-788-01	SHAFT (2)	
307	*3-725-791-01	SPRING, TENSION	

6-8. REMOTE CONTROL UNIT



Ref.No	Part No.	Description	Remark
351	9-901-744-01	ORNAMENTAL PANEL	
352	9-901-745-01	SHEET, RUBBER	
353	2-290-632-00	BUTTON, PUSH (L)	
354	2-290-633-00	BUTTON, PUSH (R)	
355	9-997-457-01	SR-W2 BOARD	
356	9-997-453-01	PANEL, FRONT	
357	2-290-611-00	CASE, BOTTOM	
358	2-290-606-51	COVER, BATTERY	
359	9-997-456-01	LABEL, MODEL NUMBER	
360	1-465-508-21	COMMANDER, REMOTE	

SECTION 7
ELECTRICAL PARTS LIST

VA-26

NOTE:

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS
- All resistors are in ohms
- F : nonflammable

When indicating parts by reference number, please include the board name.

CAPACITORS
- MF : μF, PF : μμF

COILS
- MMH : mH, UH : μH

Ref.No	Part No.	Description			Remark
	*A-8271-106-A	VA-26 BOARD. COMPLETE			
	************************************				
A2	*3-683-631-01	CLAMP			
A3	*3-683-631-01	CLAMP			
		<CAPACITOR>			
C1	1-124-234-00	ELECT	22MF	20%	16V
C2	1-163-097-00	CERAMIC CHIP	15PF	5%	50V
C3	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C4	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C5	1-163-089-00	CERAMIC CHIP	6PF	0.5PF	50V
C6	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C7	1-126-096-11	ELECT	10MF	20%	25V
C8	1-163-085-00	CERAMIC CHIP	2PF	0.25PF	50V
C9	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C10	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C11	1-163-085-00	CERAMIC CHIP	2PF	0.25PF	50V
C12	1-163-089-00	CERAMIC CHIP	6PF	0.5PF	50V
C13	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C14	1-124-589-11	ELECT	47MF	20%	16V
C15	1-124-234-00	ELECT	22MF	20%	16V
C16	1-163-097-00	CERAMIC CHIP	15PF	5%	50V
C17	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C18	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C19	1-163-089-00	CERAMIC CHIP	6PF	0.5PF	50V
C20	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C21	1-126-096-11	ELECT	10MF	20%	25V
C22	1-163-085-00	CERAMIC CHIP	2PF	0.25PF	50V
C23	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C24	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C25	1-163-085-00	CERAMIC CHIP	2PF	0.25PF	50V
C26	1-163-089-00	CERAMIC CHIP	6PF	0.5PF	50V
C27	1-124-234-00	ELECT	22MF	20%	16V
C28	1-163-097-00	CERAMIC CHIP	15PF	5%	50V
C29	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C30	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C31	1-163-089-00	CERAMIC CHIP	6PF	0.5PF	50V
C32	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C33	1-126-096-11	ELECT	10MF	20%	25V
C34	1-163-085-00	CERAMIC CHIP	2PF	0.25PF	50V
C35	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C36	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C37	1-163-085-00	CERAMIC CHIP	2PF	0.25PF	50V
C38	1-163-089-00	CERAMIC CHIP	6PF	0.5PF	50V
C39	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C40	1-124-589-11	ELECT	47MF	20%	16V
C41	1-124-589-11	ELECT	47MF	20%	16V
C42	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C43	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C44	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C45	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C46	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C47	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C48	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C49	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C50	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C51	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C53	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C54	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C55	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C56	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C57	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C58	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C59	1-124-589-11	ELECT	47MF	20%	16V
C60	1-124-589-11	ELECT	47MF	20%	16V
C61	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C62	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C63	1-126-301-11	ELECT	1MF	20%	50V
C64	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C65	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C66	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V
C67	1-126-301-11	ELECT	1MF	20%	50V
C68	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V
C69	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C70	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C71	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C72	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C73	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C75	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C101	1-124-234-00	ELECT	22MF	20%	16V
C102	1-124-234-00	ELECT	22MF	20%	16V
C103	1-124-234-00	ELECT	22MF	20%	16V
C104	1-124-234-00	ELECT	22MF	20%	16V
C105	1-124-234-00	ELECT	22MF	20%	16V
C106	1-124-234-00	ELECT	22MF	20%	16V
C107	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C108	1-124-234-00	ELECT	22MF	20%	16V
C109	1-124-234-00	ELECT	22MF	20%	16V
C110	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C111	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C112	1-126-301-11	ELECT	1MF	20%	50V
C113	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C114	1-124-234-00	ELECT	22MF	20%	16V
C115	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C116	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C117	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C201	1-124-234-00	ELECT	22MF	20%	16V
C214	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C215	1-126-163-11	ELECT	4.7MF	20%	25V
C216	1-163-227-11	CERAMIC CHIP	10PF	5%	50V
C217	1-163-251-11	CERAMIC CHIP	100PF	5%	50V

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Ref.No	Part No.	Description		Remark
C218	1-126-157-11	ELECT 10MF	20%	16V
C219	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C220	1-126-157-11	ELECT 10MF	20%	16V
C221	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C222	1-130-491-00	MYLAR 0.047MF	5%	50V
C223	1-163-133-00	CERAMIC CHIP 470PF	5%	50V
C224	1-163-133-00	CERAMIC CHIP 470PF	5%	50V
C225	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C226	1-126-157-11	ELECT 10MF	20%	16V
C227	1-163-275-11	CERAMIC CHIP 0.001MF	5%	50V
C228	1-126-157-11	ELECT 10MF	20%	16V
C229	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C230	1-163-227-11	CERAMIC CHIP 10PF	5%	50V
C240	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C241	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C243	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C244	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C245	1-130-495-00	MYLAR 0.1MF	5%	50V
C246	1-130-499-00	MYLAR 0.22MF	5%	50V
C247	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C248	1-126-157-11	ELECT 10MF	20%	16V
C302	1-124-234-00	ELECT 22MF	20%	16V
C303	1-163-237-11	CERAMIC CHIP 27PF	5%	50V
C304	1-126-157-11	ELECT 10MF	20%	16V
C305	1-163-115-00	CERAMIC CHIP 82PF	5%	50V
C306	1-126-301-11	ELECT 1MF	20%	50V
C307	1-126-301-11	ELECT 1MF	20%	50V
C308	1-163-125-00	CERAMIC CHIP 220PF	5%	50V
C309	1-163-115-00	CERAMIC CHIP 82PF	5%	50V
C310	1-163-121-00	CERAMIC CHIP 150PF	5%	50V
C311	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C312	1-163-263-11	CERAMIC CHIP 330PF	5%	50V
C313	1-163-251-11	CERAMIC CHIP 100PF	5%	50V
C314	1-124-589-11	ELECT 47MF	20%	16V
C315	1-126-157-11	ELECT 10MF	20%	16V
C316	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C317	1-163-037-11	CERAMIC CHIP 0.022MF	10%	25V
C318	1-163-037-11	CERAMIC CHIP 0.022MF	10%	25V
C319	1-124-589-11	ELECT 47MF	20%	16V
C320	1-124-234-00	ELECT 22MF	20%	16V
C321	1-124-234-00	ELECT 22MF	20%	16V
C322	1-124-589-11	ELECT 47MF	20%	10V
C323	1-124-589-11	ELECT 47MF	20%	16V
C324	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C325	1-124-589-11	ELECT 47MF	20%	16V
C326	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C327	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C328	1-124-589-11	ELECT 47MF	20%	16V
C329	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C330	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C331	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C333	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C334	1-124-234-00	ELECT 22MF	20%	16V
C335	1-124-234-00	ELECT 22MF	20%	16V
C336	1-163-241-11	CERAMIC CHIP 39PF	5%	50V
C337	1-163-241-11	CERAMIC CHIP 39PF	5%	50V
C338	1-124-234-00	ELECT 22MF	20%	16V
C339	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C340	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C341	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C342	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C343	1-124-234-00	ELECT 22MF	20%	16V
C345	1-124-589-11	ELECT 47MF	20%	16V
C346	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C347	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C348	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C349	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C350	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C351	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C352	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C353	1-124-234-00	ELECT 22MF	20%	16V
C354	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C355	1-124-234-00	ELECT 22MF	20%	16V
C356	1-124-234-00	ELECT 22MF	20%	16V
C357	1-124-234-00	ELECT 22MF	20%	16V
C360	1-124-589-11	ELECT 47MF	20%	16V
C361	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C362	1-124-234-00	ELECT 22MF	20%	25V
C363	1-163-038-00	CERAMIC CHIP 0.1MF		16V
C364	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C365	1-124-234-00	ELECT 22MF	20%	16V
C366	1-163-038-00	CERAMIC CHIP 0.1MF		16V
C367	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C368	1-124-234-00	ELECT 22MF	20%	25V
C369	1-163-038-00	CERAMIC CHIP 0.1MF		16V
C370	1-124-589-11	ELECT 47MF	20%	50V
C371	1-124-589-11	ELECT 47MF	20%	25V
C372	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C373	1-163-038-00	CERAMIC CHIP 0.1MF		16V
C374	1-124-589-11	ELECT 47MF	20%	16V
C375	1-136-173-00	FILM 0.47MF	5%	16V
C376	1-163-038-00	CERAMIC CHIP 0.1MF		16V
C378	1-163-038-00	CERAMIC CHIP 0.1MF		16V
C379	1-124-234-00	ELECT 22MF	20%	16V
C380	1-124-234-00	ELECT 22MF	20%	25V
C381	1-124-234-00	ELECT 22MF	20%	50V
C382	1-124-234-00	ELECT 22MF	20%	25V
C383	1-124-234-00	ELECT 22MF	20%	25V
C384	1-124-234-00	ELECT 22MF	20%	25V
C385	1-126-163-11	ELECT 4.7MF	20%	50V
C386	1-130-491-00	MYLAR 0.047MF	5%	50V
C387	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C388	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C389	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C390	1-163-099-00	CERAMIC CHIP 18PF	5%	50V
C391	1-163-235-11	CERAMIC CHIP 22PF	5%	50V
C392	1-163-037-11	CERAMIC CHIP 0.022MF	10%	50V
C393	1-163-037-11	CERAMIC CHIP 0.022MF	10%	25V
C394	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C395	1-126-301-11	ELECT 1MF	20%	25V
C396	1-126-301-11	ELECT 1MF	20%	16V
C398	1-163-235-11	CERAMIC CHIP 22PF	5%	25V
C399	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C400	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C401	1-163-038-00	CERAMIC CHIP 0.1MF		16V
C402	1-124-589-11	ELECT 47MF	20%	25V
C501	1-163-038-00	CERAMIC CHIP 0.1MF		16V
C502	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C503	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C504	1-124-589-11	ELECT 47MF	20%	16V

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
C505	1-163-038-00	CERAMIC CHIP	0.1MF		16V
C506	1-124-589-11	ELECT	47MF	20%	25V
C507	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C508	1-163-038-00	CERAMIC CHIP	0.1MF		16V
C509	1-124-589-11	ELECT	47MF	20%	16V
C510	1-124-589-11	ELECT	47MF	20%	
C511	1-163-038-00	CERAMIC CHIP	0.1MF		
C512	1-163-038-00	CERAMIC CHIP	0.1MF		
C513	1-124-589-11	ELECT	47MF	20%	
C514	1-124-589-11	ELECT	47MF	20%	
C515	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C516	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C517	1-124-120-11	ELECT	220MF	20%	16V
C518	1-124-120-11	ELECT	220MF	20%	16V
C519	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C520	1-126-176-11	ELECT	220MF	20%	10V
C521	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C522	1-126-176-11	ELECT	220MF	20%	10V
C523	1-124-589-11	ELECT	47MF	20%	16V
C524	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C525	1-124-589-11	ELECT	47MF	20%	16V
C526	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C527	1-124-589-11	ELECT	47MF	20%	16V
C528	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C529	1-124-589-11	ELECT	47MF	20%	16V
C530	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C531	1-124-589-11	ELECT	47MF	20%	16V
C532	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C533	1-124-589-11	ELECT	47MF	20%	16V
C536	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C601	1-124-234-00	ELECT	22MF	20%	16V
C602	1-126-157-11	ELECT	10MF	20%	16V
C603	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C604	1-126-157-11	ELECT	10MF	20%	16V
C605	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C606	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C628	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V
C636	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C637	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V
C1001	1-124-635-00	ELECT	220MF	20%	6.3V
C1002	1-124-455-00	ELECT	100MF	20%	16V
C1003	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1004	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1005	1-124-635-00	ELECT	220MF	20%	6.3V
C1006	1-124-455-00	ELECT	100MF	20%	16V
C1007	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1008	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1009	1-124-635-00	ELECT	220MF	20%	6.3V
C1010	1-124-455-00	ELECT	100MF	20%	16V
C1011	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1012	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1013	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1014	1-124-635-00	ELECT	220MF	20%	6.3V
C1015	1-126-096-11	ELECT	10MF	20%	25V
C1016	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C1022	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1023	1-126-096-11	ELECT	10MF	20%	25V
C1025	1-126-177-11	ELECT	100MF	20%	6.3V
C1031	1-126-177-11	ELECT	100MF	20%	6.3V
C1034	1-126-096-11	ELECT	10MF	20%	25V
C1038	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1042	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1043	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1044	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1045	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1061	1-163-227-11	CERAMIC CHIP	10PF	5%	50V
C1078	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C1079	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1080	1-126-096-11	ELECT	10MF	20%	25V
C1081	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1082	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1083	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1084	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C1085	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1086	1-126-096-11	ELECT	10MF	20%	25V
C1087	1-163-137-00	CERAMIC CHIP	680PF	5%	50V
C1088	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1089	1-126-096-11	ELECT	10MF	20%	25V
C1090	1-136-173-00	FILM	0.47MF	5%	50V
C1091	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1092	1-163-275-11	CERAMIC CHIP	0.001MF	5%	50V
C1093	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
C1094	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C1095	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C1096	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C1097	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1098	1-124-589-11	ELECT	47MF	20%	16V
C1099	1-130-483-00	MYLAR	0.01MF	5%	50V
C1100	1-163-275-11	CERAMIC CHIP	0.001MF	5%	50V
C1101	1-163-275-11	CERAMIC CHIP	0.001MF	5%	50V
C1102	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1103	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1104	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C1105	1-163-037-11	CERAMIC CHIP	0.022MF	10%	25V
C1106	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C1107	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C1108	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1109	1-124-589-11	ELECT	47MF	20%	16V
C1110	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C1114	1-163-275-11	CERAMIC CHIP	0.001MF	5%	50V
C1115	1-124-635-00	ELECT	220MF	20%	6.3V
C1116	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1117	1-124-234-00	ELECT	22MF	20%	16V
C1118	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1119	1-124-635-00	ELECT	220MF	20%	6.3V
C1120	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1121	1-124-234-00	ELECT	22MF	20%	16V
C1122	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1123	1-124-635-00	ELECT	220MF	20%	6.3V
C1124	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1125	1-124-234-00	ELECT	22MF	20%	16V
C1126	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1127	1-124-635-00	ELECT	220MF	20%	6.3V
C1128	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1129	1-124-234-00	ELECT	22MF	20%	16V
C1130	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1131	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1132	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1134	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C1135	1-124-234-00	ELECT	22MF	20%	16V

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description	Remark
C1136	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1137	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1138	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1139	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1140	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1141	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1142	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1143	1-126-096-11	ELECT 10MF 20%	25V
C1144	1-126-096-11	ELECT 10MF 20%	25V
C1145	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1146	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1147	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1148	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1149	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1150	1-124-234-00	ELECT 22MF 20%	16V
C1151	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1152	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1153	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1154	1-124-589-11	ELECT 47MF 20%	16V
C1155	1-124-589-11	ELECT 47MF 20%	16V
C1156	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1157	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C1158	1-124-589-11	ELECT 47MF 20%	16V
C1159	1-163-038-00	CERAMIC CHIP 0.1MF	25V
		<CONNECTOR>	
CN1	*1-568-935-11	PIN, CONNECTOR (STRAIGHT) 8P	
CN5	*1-568-935-11	PIN, CONNECTOR 8P	
CN101	*1-568-935-11	PIN, CONNECTOR 8P	
CN301	*1-568-953-11	PIN, CONNECTOR 4P	
CN302	*1-568-951-11	PIN, CONNECTOR 2P	
CN501	*1-568-935-11	PIN, CONNECTOR 8P	
CN502	*1-506-468-11	PIN, CONNECTOR 3P	
CN503	*1-568-936-11	PIN, CONNECTOR 9P	
CN504	*1-506-469-11	PIN, CONNECTOR 4P	
CN1001	*1-568-954-11	PIN, CONNECTOR 5P	
CN1002	*1-506-469-11	PIN, CONNECTOR (STRAIGHT) 4P	
CN1003	*1-568-954-11	PIN, CONNECTOR 5P	
CN1004	*1-568-934-11	PIN, CONNECTOR 7P	
CN1005	*1-568-935-11	PIN, CONNECTOR 8P	
CN1006	*1-568-951-11	PIN, CONNECTOR 2P	
CN1007	*1-506-469-11	PIN, CONNECTOR 4P	
		<TRIMMER>	
CV1001	1-141-245-00	TRIMMER, CERAMIC	
CV1002	1-141-260-00	TRIMMER, CERAMIC	
		<DIODE>	
D4	8-719-400-18	DIODE MA152WK	
D5	8-719-104-34	DIODE 1S2836	
D6	8-719-400-18	DIODE MA152WK	
D7	8-719-400-18	DIODE MA152WK	
D8	8-719-800-76	DIODE 1SS226	
D9	8-719-800-76	DIODE 1SS226	
D10	8-719-800-76	DIODE 1SS226	
D11	8-719-104-34	DIODE 1S2836	
D12	8-719-104-34	DIODE 1S2836	
D101	8-719-800-76	DIODE 1SS226	
D201	8-719-104-34	DIODE 1S2836	
D301	8-719-800-76	DIODE 1SS226	

Ref.No	Part No.	Description	Remark
D302	8-719-105-83	DIODE RD5.1M-B3	
D501	8-719-800-76	DIODE 1SS226	
D502	8-719-800-76	DIODE 1SS226	
D1002	8-719-800-09	DIODE 1SV101	
D1003	8-719-105-58	DIODE RD3.9M-B2	
D1004	8-719-105-73	DIODE RD4.7M-B2	
D1005	8-719-104-34	DIODE 1S2836	
		<DELAY LINE>	
DL301	1-415-107-31	DELAY LINE (1H)	
DL302	1-415-306-00	DELAY LINE (340NS)	
DL303	1-415-321-00	DELAY LINE (500N SEC)	
DL1001	1-415-448-21	DELAY LINE	
		<FILTER>	
FL1001	1-235-277-00	FILTER, BAND PASS	
		<IC>	
IC2	8-759-908-17	IC TL082CPS	
IC3	8-759-908-17	IC TL082CPS	
IC4	8-759-300-71	IC HD14053BFP	
IC5	8-759-300-71	IC HD14053BFP	
IC6	8-759-300-71	IC HD14053BFP	
IC7	8-759-300-71	IC HD14053BFP	
IC101	8-759-908-17	IC TL082CPS	
IC102	8-759-206-28	IC MC74HC123AF	
IC201	8-759-300-71	IC HD14053BFP	
IC203	8-759-907-81	IC SN74LS221NS	
IC204	8-759-925-90	IC SN74HC74ANS	
IC206	8-759-009-51	IC MC14538BF	
IC207	8-759-916-25	IC SN74HC32ANS	
IC208	8-759-300-71	IC HD14053BFP	
IC209	8-759-201-47	IC TA7357AP	
IC301	8-759-300-71	IC HD14053BFP	
IC302	8-759-300-71	IC HD14053BFP	
IC303	8-759-908-17	IC TL082CPS	
IC304	8-759-908-17	IC TL082CPS	
IC305	8-759-300-71	IC HD14053BFP	
IC306	8-759-300-71	IC HD14053BFP	
IC307	8-759-300-71	IC HD14053BFP	
IC308	8-759-300-71	IC HD14053BFP	
IC309	8-759-982-21	IC RC78L05A	
IC315	8-752-033-32	IC CXA1228S	
IC501	8-759-927-46	IC SN74HC00ANS	
IC502	8-759-927-46	IC SN74HC00ANS	
IC503	8-759-982-10	IC RC7809FA	
IC504	8-759-982-39	IC RC7909FA	
IC505	8-759-982-38	IC RC7905FA	
IC506	8-759-982-10	IC RC7809FA	
IC507	8-759-982-39	IC RC7909FA	
IC508	8-759-982-38	IC RC7905FA	
IC701	8-759-981-99	IC RC4560M	
IC702	8-759-981-99	IC RC4560M	
IC1001	8-759-239-23	IC TC74HC86AF	
IC1002	8-752-332-67	IC CXD1217M	
IC1003	8-759-927-46	IC SN74HC00ANS	
IC1008	8-752-033-58	IC V7040	
IC1013	8-759-041-18	IC UPD6451AGT-616	
IC1022	8-759-927-46	IC SN74HC00ANS	
IC1023	8-759-926-23	IC SN74HC163ANS	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
IC1024	8-759-926-23	IC SN74HC163ANS	
IC1025	8-759-926-23	IC SN74HC163ANS	
IC1026	8-749-901-21	IC BX-1461	
IC1027	8-759-907-81	IC SN74LS221NS	
IC1029	8-759-926-52	IC SN74HC257NS	
IC1030	8-759-206-28	IC MC74HC123AF	
IC1031	8-759-907-81	IC SN74LS221NS	
IC1032	8-759-925-76	IC SN74HC08ANS	
IC1033	8-759-925-81	IC SN74HC20ANS	
IC1034	8-759-982-21	IC RC78L05A	
IC1142	8-759-908-17	IC TL082CPS	
		<INDUCTOR>	
L1	1-408-970-21	INDUCTOR 10UH	
L2	1-408-970-21	INDUCTOR 10UH	
L3	1-408-970-21	INDUCTOR 10UH	
L4	1-408-968-21	INDUCTOR 6.8UH	
L5	1-408-969-21	INDUCTOR 8.2UH	
L6	1-408-968-21	INDUCTOR 6.8UH	
L7	1-408-969-21	INDUCTOR 8.2UH	
L8	1-408-968-21	INDUCTOR 6.8UH	
L9	1-408-969-21	INDUCTOR 8.2UH	
L101	1-408-970-21	INDUCTOR 10UH	
L102	1-408-970-21	INDUCTOR 10UH	
L203	1-408-973-21	INDUCTOR 18UH	
L204	1-408-970-21	INDUCTOR 10UH	
L205	1-408-970-21	INDUCTOR 10UH	
L301	1-408-970-21	INDUCTOR 10UH	
L302	1-408-970-21	INDUCTOR 10UH	
L303	1-408-973-21	INDUCTOR 18UH	
L304	1-408-973-21	INDUCTOR 18UH	
L305	1-408-972-21	INDUCTOR 15UH	
L306	1-408-972-21	INDUCTOR 15UH	
L308	1-408-973-21	INDUCTOR 18UH	
L310	1-408-970-21	INDUCTOR 10UH	
L315	1-408-970-21	INDUCTOR 10UH	
L316	1-408-970-21	INDUCTOR 10UH	
L317	1-408-970-21	INDUCTOR 10UH	
L318	1-408-970-21	INDUCTOR 10UH	
L319	1-408-976-21	INDUCTOR 33UH	
L320	1-408-978-21	INDUCTOR 47UH	
L501	1-412-525-21	INDUCTOR 10UH	
L502	1-412-525-21	INDUCTOR 10UH	
L503	1-412-525-21	INDUCTOR 10UH	
L504	1-412-525-21	INDUCTOR 10UH	
L601	1-408-970-21	INDUCTOR 10UH	
L602	1-408-970-21	INDUCTOR 10UH	
L610	1-408-969-21	INDUCTOR 8.2UH	
L1004	1-407-169-XX	INDUCTOR 100UH	
L1005	1-408-970-21	INDUCTOR 10UH	
L1006	1-407-169-XX	INDUCTOR 100UH	
L1007	1-408-958-21	INDUCTOR 1UH	
L1009	1-408-976-21	INDUCTOR 33UH	
L1010	1-408-970-21	INDUCTOR 10UH	
L1011	1-408-977-21	INDUCTOR 39UH	
L1012	1-408-970-21	INDUCTOR 10UH	
L1013	1-408-970-21	INDUCTOR 10UH	
L1014	1-408-970-21	INDUCTOR 10UH	
L1015	1-407-169-XX	INDUCTOR 100UH	
L1016	1-408-970-21	INDUCTOR 10UH	
L1017	1-408-970-21	INDUCTOR 10UH	

Ref.No	Part No.	Description	Remark
LV301	1-407-571-00	COIL, VARIABLE 22UH	
LV1004	1-407-563-00	COIL, VARIABLE 1UH	
		<TRANSISTOR>	
Q1	8-729-100-66	TRANSISTOR 2SC1623	
Q2	8-729-100-66	TRANSISTOR 2SC1623	
Q3	8-729-100-66	TRANSISTOR 2SC1623	
Q4	8-729-216-22	TRANSISTOR 2SA1162	
Q5	8-729-202-38	TRANSISTOR 2SC3326N	
Q6	8-729-100-66	TRANSISTOR 2SC1623	
Q7	8-729-100-66	TRANSISTOR 2SC1623	
Q8	8-729-100-66	TRANSISTOR 2SC1623	
Q9	8-729-122-63	TRANSISTOR 2SA1226	
Q10	8-729-200-87	TRANSISTOR 2SC2714-Y	
Q11	8-729-200-87	TRANSISTOR 2SC2714-Y	
Q12	8-729-100-66	TRANSISTOR 2SC1623	
Q13	8-729-100-66	TRANSISTOR 2SC1623	
Q14	8-729-100-66	TRANSISTOR 2SC1623	
Q15	8-729-216-22	TRANSISTOR 2SA1162	
Q16	8-729-202-38	TRANSISTOR 2SC3326N	
Q17	8-729-100-66	TRANSISTOR 2SC1623	
Q18	8-729-100-66	TRANSISTOR 2SC1623	
Q19	8-729-100-66	TRANSISTOR 2SC1623	
Q20	8-729-122-63	TRANSISTOR 2SA1226	
Q21	8-729-200-87	TRANSISTOR 2SC2714-Y	
Q22	8-729-200-87	TRANSISTOR 2SC2714-Y	
Q23	8-729-100-66	TRANSISTOR 2SC1623	
Q24	8-729-100-66	TRANSISTOR 2SC1623	
Q25	8-729-100-66	TRANSISTOR 2SC1623	
Q26	8-729-216-22	TRANSISTOR 2SA1162	
Q27	8-729-100-66	TRANSISTOR 2SC1623	
Q28	8-729-100-66	TRANSISTOR 2SC1623	
Q29	8-729-100-66	TRANSISTOR 2SC1623	
Q30	8-729-122-63	TRANSISTOR 2SA1226	
Q31	8-729-200-87	TRANSISTOR 2SC2714-Y	
Q32	8-729-200-87	TRANSISTOR 2SC2714-Y	
Q33	8-729-216-22	TRANSISTOR 2SA1162	
Q35	8-729-216-22	TRANSISTOR 2SA1162	
Q36	8-729-216-22	TRANSISTOR 2SA1162	
Q37	8-729-216-22	TRANSISTOR 2SA1162	
Q38	8-729-100-66	TRANSISTOR 2SC1623	
Q39	8-729-100-66	TRANSISTOR 2SC1623	
Q40	8-729-202-38	TRANSISTOR 2SC3326N	
Q101	8-729-100-66	TRANSISTOR 2SC1623	
Q102	8-729-100-66	TRANSISTOR 2SC1623	
Q103	8-729-100-66	TRANSISTOR 2SC1623	
Q104	8-729-100-66	TRANSISTOR 2SC1623	
Q201	8-729-100-66	TRANSISTOR 2SC1623	
Q202	8-729-100-66	TRANSISTOR 2SC1623	
Q203	8-729-216-22	TRANSISTOR 2SA1162	
Q204	8-729-216-22	TRANSISTOR 2SA1162	
Q303	8-729-100-66	TRANSISTOR 2SC1623	
Q304	8-729-100-66	TRANSISTOR 2SC1623	
Q305	8-729-216-22	TRANSISTOR 2SA1162	
Q306	8-729-100-66	TRANSISTOR 2SC1623	
Q307	8-729-100-66	TRANSISTOR 2SC1623	
Q308	8-729-100-66	TRANSISTOR 2SC1623	
Q309	8-729-100-66	TRANSISTOR 2SC1623	
Q310	8-729-100-66	TRANSISTOR 2SC1623	

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description	Remark
Q311	8-729-216-22	TRANSISTOR 2SA1162	
Q312	8-729-100-66	TRANSISTOR 2SC1623	
Q313	8-729-100-66	TRANSISTOR 2SC1623	
Q314	8-729-100-66	TRANSISTOR 2SC1623	
Q315	8-729-100-66	TRANSISTOR 2SC1623	
Q316	8-729-100-66	TRANSISTOR 2SC1623	
Q318	8-729-202-38	TRANSISTOR 2SC3326N	
Q319	8-729-202-38	TRANSISTOR 2SC3326N	
Q320	8-729-202-38	TRANSISTOR 2SC3326N	
Q321	8-729-216-22	TRANSISTOR 2SA1162	
Q322	8-729-216-22	TRANSISTOR 2SA1162	
Q323	8-729-100-66	TRANSISTOR 2SC1623	
Q324	8-729-100-66	TRANSISTOR 2SC1623	
Q325	8-729-216-22	TRANSISTOR 2SA1162	
Q326	8-729-100-66	TRANSISTOR 2SC1623	
Q327	8-729-100-66	TRANSISTOR 2SC1623	
Q328	8-729-100-66	TRANSISTOR 2SC1623	
Q329	8-729-100-66	TRANSISTOR 2SC1623	
Q330	8-729-100-66	TRANSISTOR 2SC1623	
Q331	8-729-100-66	TRANSISTOR 2SC1623	
Q332	8-729-216-22	TRANSISTOR 2SA1162	
Q333	8-729-100-66	TRANSISTOR 2SC1623	
Q334	8-729-100-66	TRANSISTOR 2SC1623	
Q335	8-729-100-66	TRANSISTOR 2SC1623	
Q338	8-729-100-66	TRANSISTOR 2SC1623	
Q339	8-729-100-66	TRANSISTOR 2SC1623	
Q340	8-729-100-66	TRANSISTOR 2SC1623	
Q345	8-729-100-66	TRANSISTOR 2SC1623	
Q346	8-729-100-66	TRANSISTOR 2SC1623	
Q347	8-729-100-66	TRANSISTOR 2SC1623	
Q348	8-729-100-66	TRANSISTOR 2SC1623	
Q349	8-729-100-66	TRANSISTOR 2SC1623	
Q350	8-729-100-66	TRANSISTOR 2SC1623	
Q351	8-729-100-66	TRANSISTOR 2SC1623	
Q353	8-729-100-66	TRANSISTOR 2SC1623	
Q354	8-729-100-66	TRANSISTOR 2SC1623	
Q355	8-729-216-22	TRANSISTOR 2SA1162	
Q356	8-729-202-38	TRANSISTOR 2SC3326N	
Q357	8-729-216-22	TRANSISTOR 2SA1162	
Q358	8-729-202-38	TRANSISTOR 2SC3326N	
Q359	8-729-216-22	TRANSISTOR 2SA1162	
Q360	8-729-202-38	TRANSISTOR 2SC3326N	
Q363	8-729-100-66	TRANSISTOR 2SC1623	
Q364	8-729-100-66	TRANSISTOR 2SC1623	
Q365	8-729-100-66	TRANSISTOR 2SC1623	
Q366	8-729-100-66	TRANSISTOR 2SC1623	
Q367	8-729-100-66	TRANSISTOR 2SC1623	
Q601	8-729-100-66	TRANSISTOR 2SC1623	
Q602	8-729-100-66	TRANSISTOR 2SC1623	
Q603	8-729-100-66	TRANSISTOR 2SC1623	
Q1001	8-769-401-89	TRANSISTOR TX-429M	
Q1002	8-729-100-66	TRANSISTOR 2SC1623	
Q1003	8-729-100-66	TRANSISTOR 2SC1623	
Q1004	8-769-401-89	TRANSISTOR TX-429M	
Q1005	8-729-100-66	TRANSISTOR 2SC1623	
Q1006	8-729-100-66	TRANSISTOR 2SC1623	
Q1007	8-769-401-89	TRANSISTOR TX-429M	
Q1008	8-729-100-66	TRANSISTOR 2SC1623	
Q1009	8-729-100-66	TRANSISTOR 2SC1623	
Q1010	8-729-100-66	TRANSISTOR 2SC1623	

Ref.No	Part No.	Description				Remark
Q1015	8-729-100-66	TRANSISTOR 2SC1623				
Q1016	8-729-100-66	TRANSISTOR 2SC1623				
Q1017	8-729-100-66	TRANSISTOR 2SC1623				
Q1018	8-729-100-66	TRANSISTOR 2SC1623				
Q1019	8-729-100-66	TRANSISTOR 2SC1623				
Q1028	8-729-100-66	TRANSISTOR 2SC1623				
Q1029	8-729-100-66	TRANSISTOR 2SC1623				
Q1034	8-729-100-66	TRANSISTOR 2SC1623				
Q1035	8-729-100-66	TRANSISTOR 2SC1623				
Q1036	8-729-100-66	TRANSISTOR 2SC1623				
Q1037	8-729-100-66	TRANSISTOR 2SC1623				
Q1038	8-729-100-66	TRANSISTOR 2SC1623				
Q1039	8-729-100-66	TRANSISTOR 2SC1623				
Q1040	8-729-100-66	TRANSISTOR 2SC1623				
Q1041	8-729-100-66	TRANSISTOR 2SC1623				
Q1042	8-729-175-72	TRANSISTOR 2SC2757-T33				
Q1043	8-729-175-72	TRANSISTOR 2SC2757-T33				
Q1044	8-729-100-66	TRANSISTOR 2SC1623				
Q1045	8-729-100-66	TRANSISTOR 2SC1623				
		<RESISTOR>				
R1	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R2	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R3	1-216-037-00	METAL GLAZE	330	5%	1/10W	
R4	1-216-043-00	METAL GLAZE	560	5%	1/10W	
R5	1-216-039-00	METAL GLAZE	390	5%	1/10W	
R6	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R7	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R8	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R9	1-216-037-00	METAL GLAZE	330	5%	1/10W	
R10	1-216-037-00	METAL GLAZE	330	5%	1/10W	
R11	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R12	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R13	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R14	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R15	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R16	1-216-071-00	METAL GLAZE	8.2K	5%	1/10W	
R17	1-216-051-00	METAL GLAZE	1.2K	5%	1/10W	
R18	1-216-037-00	METAL GLAZE	330	5%	1/10W	
R19	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R20	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W	
R21	1-216-045-00	METAL GLAZE	680	5%	1/10W	
R22	1-216-001-00	METAL GLAZE	10	5%	1/10W	
R23	1-216-017-00	METAL GLAZE	47	5%	1/10W	
R24	1-216-053-00	METAL GLAZE	1.5K	5%	1/10W	
R25	1-216-308-00	METAL GLAZE	4.7	5%	1/10W	
R26	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R27	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R28	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R29	1-216-037-00	METAL GLAZE	330	5%	1/10W	
R30	1-216-043-00	METAL GLAZE	560	5%	1/10W	
R31	1-216-039-00	METAL GLAZE	390	5%	1/10W	
R32	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R33	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R34	1-216-037-00	METAL GLAZE	330	5%	1/10W	
R35	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R36	1-216-037-00	METAL GLAZE	330	5%	1/10W	
R37	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R38	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R39	1-216-049-00	METAL GLAZE	1K	5%	1/10W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
R40	1-216-025-00	METAL GLAZE	100	5%	1/10W
R41	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R42	1-216-071-00	METAL GLAZE	8.2K	5%	1/10W
R43	1-216-051-00	METAL GLAZE	1.2K	5%	1/10W
R44	1-216-037-00	METAL GLAZE	330	5%	1/10W
R45	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R46	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R47	1-216-045-00	METAL GLAZE	680	5%	1/10W
R48	1-216-001-00	METAL GLAZE	10	5%	1/10W
R49	1-216-017-00	METAL GLAZE	47	5%	1/10W
R50	1-216-053-00	METAL GLAZE	1.5K	5%	1/10W
R51	1-216-308-00	METAL GLAZE	4.7	5%	1/10W
R52	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R53	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R54	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R55	1-216-037-00	METAL GLAZE	330	5%	1/10W
R56	1-216-043-00	METAL GLAZE	560	5%	1/10W
R57	1-216-039-00	METAL GLAZE	390	5%	1/10W
R58	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R59	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R60	1-216-037-00	METAL GLAZE	330	5%	1/10W
R61	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R62	1-216-037-00	METAL GLAZE	330	5%	1/10W
R63	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R64	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R65	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R66	1-216-025-00	METAL GLAZE	100	5%	1/10W
R67	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R68	1-216-071-00	METAL GLAZE	8.2K	5%	1/10W
R69	1-216-051-00	METAL GLAZE	1.2K	5%	1/10W
R70	1-216-037-00	METAL GLAZE	330	5%	1/10W
R71	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R72	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R73	1-216-045-00	METAL GLAZE	680	5%	1/10W
R74	1-216-001-00	METAL GLAZE	10	5%	1/10W
R75	1-216-017-00	METAL GLAZE	47	5%	1/10W
R76	1-216-053-00	METAL GLAZE	1.5K	5%	1/10W
R77	1-216-308-00	METAL GLAZE	4.7	5%	1/10W
R78	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R79	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R81	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R82	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R83	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R85	1-216-009-00	METAL GLAZE	22	5%	1/10W
R86	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R87	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R88	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R89	1-216-009-00	METAL GLAZE	22	5%	1/10W
R90	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R91	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R92	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R93	1-216-009-00	METAL GLAZE	22	5%	1/10W
R94	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R95	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R96	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R100	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R101	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R102	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R103	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R104	1-216-017-00	METAL GLAZE	47	5%	1/10W
R105	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R106	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R107	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R108	1-216-017-00	METAL GLAZE	47	5%	1/10W
R109	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R110	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R111	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R112	1-216-017-00	METAL GLAZE	47	5%	1/10W
R113	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R114	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R115	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R116	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R117	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R118	1-216-027-00	METAL GLAZE	120	5%	1/10W
R119	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R120	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R121	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R129	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R130	1-216-025-00	METAL GLAZE	100	5%	1/10W
R131	1-216-025-00	METAL GLAZE	100	5%	1/10W
R132	1-216-025-00	METAL GLAZE	100	5%	1/10W
R210	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R211	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R212	1-216-031-00	METAL GLAZE	180	5%	1/10W
R213	1-216-035-00	METAL GLAZE	270	5%	1/10W
R214	1-216-037-00	METAL GLAZE	330	5%	1/10W
R215	1-216-043-00	METAL GLAZE	560	5%	1/10W
R216	1-216-035-00	METAL GLAZE	270	5%	1/10W
R217	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R218	1-216-101-00	METAL GLAZE	150K	5%	1/10W
R219	1-216-075-00	METAL GLAZE	12K	5%	1/10W
R220	1-216-113-00	METAL GLAZE	470K	5%	1/10W
R221	1-216-095-00	METAL GLAZE	82K	5%	1/10W
R222	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R223	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R224	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R225	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R226	1-216-067-00	METAL GLAZE	5.6K	5%	1/10W
R227	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R228	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R229	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R230	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R232	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R233	1-216-093-00	METAL GLAZE	68K	5%	1/10W
R234	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R235	1-216-025-00	METAL GLAZE	100	5%	1/10W
R236	1-216-101-00	METAL GLAZE	150K	5%	1/10W
R237	1-216-041-00	METAL GLAZE	470	5%	1/10W
R238	1-216-101-00	METAL GLAZE	150K	5%	1/10W
R239	1-216-071-00	METAL GLAZE	8.2K	5%	1/10W
R301	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R302	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R303	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R304	1-216-025-00	METAL GLAZE	100	5%	1/10W
R305	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R306	1-216-031-00	METAL GLAZE	180	5%	1/10W
R307	1-216-025-00	METAL GLAZE	100	5%	1/10W
R308	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R309	1-216-043-00	METAL GLAZE	560	5%	1/10W

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description			Remark
R310	1-216-037-00	METAL GLAZE	330	5%	1/10W
R311	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R312	1-216-093-00	METAL GLAZE	68K	5%	1/10W
R313	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R314	1-216-041-00	METAL GLAZE	470	5%	1/10W
R315	1-216-041-00	METAL GLAZE	470	5%	1/10W
R316	1-216-025-00	METAL GLAZE	100	5%	1/10W
R317	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R318	1-216-045-00	METAL GLAZE	680	5%	1/10W
R319	1-216-033-00	METAL GLAZE	220	5%	1/10W
R320	1-216-021-00	METAL GLAZE	68	5%	1/10W
R321	1-216-033-00	METAL GLAZE	220	5%	1/10W
R322	1-216-045-00	METAL GLAZE	680	5%	1/10W
R323	1-216-037-00	METAL GLAZE	330	5%	1/10W
R324	1-216-045-00	METAL GLAZE	680	5%	1/10W
R325	1-216-045-00	METAL GLAZE	680	5%	1/10W
R326	1-216-045-00	METAL GLAZE	680	5%	1/10W
R327	1-216-045-00	METAL GLAZE	680	5%	1/10W
R328	1-216-041-00	METAL GLAZE	470	5%	1/10W
R329	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R330	1-216-063-00	METAL GLAZE	3.9K	5%	1/10W
R331	1-216-059-00	METAL GLAZE	2.7K	5%	1/10W
R332	1-216-658-11	METAL CHIP	2K	0.50%	1/10W
R333	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R335	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R336	1-216-025-00	METAL GLAZE	100	5%	1/10W
R337	1-216-642-11	METAL CHIP	430	0.50%	1/10W
R338	1-216-045-00	METAL GLAZE	680	5%	1/10W
R339	1-216-037-00	METAL GLAZE	330	5%	1/10W
R340	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R341	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R345	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R346	1-216-041-00	METAL GLAZE	470	5%	1/10W
R347	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R348	1-216-051-00	METAL GLAZE	1.2K	5%	1/10W
R349	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R350	1-216-091-00	METAL GLAZE	56K	5%	1/10W
R351	1-216-039-00	METAL GLAZE	390	5%	1/10W
R352	1-216-041-00	METAL GLAZE	470	5%	1/10W
R353	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R354	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R355	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R356	1-216-025-00	METAL GLAZE	100	5%	1/10W
R358	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R359	1-216-091-00	METAL GLAZE	56K	5%	1/10W
R360	1-216-045-00	METAL GLAZE	680	5%	1/10W
R363	1-216-025-00	METAL GLAZE	100	5%	1/10W
R364	1-216-025-00	METAL GLAZE	100	5%	1/10W
R387	1-216-025-00	METAL GLAZE	100	5%	1/10W
R388	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R389	1-216-651-11	METAL CHIP	1K	0.50%	1/10W
R390	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R391	1-216-630-11	METAL CHIP	130	0.50%	1/10W
R392	1-216-649-11	METAL CHIP	820	0.50%	1/10W
R393	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R394	1-216-025-00	METAL GLAZE	100	5%	1/10W
R395	1-216-025-00	METAL GLAZE	100	5%	1/10W
R396	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R397	1-216-025-00	METAL GLAZE	100	5%	1/10W
R398	1-216-025-00	METAL GLAZE	100	5%	1/10W

Ref.No	Part No.	Description			RemarK
R399	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R400	1-216-643-11	METAL CHIP	470	0.50%	1/10W
R401	1-216-657-11	METAL CHIP	1.8K	0.50%	1/10W
R402	1-216-620-11	METAL CHIP	51	0.50%	1/10W
R403	1-216-671-11	METAL CHIP	6.8K	0.50%	1/10W
R404	1-216-665-11	METAL CHIP	3.9K	0.50%	1/10W
R405	1-216-628-11	METAL CHIP	110	0.50%	1/10W
R406	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R407	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R408	1-216-025-00	METAL GLAZE	100	5%	1/10W
R409	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R410	1-216-025-00	METAL GLAZE	100	5%	1/10W
R411	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R412	1-216-025-00	METAL GLAZE	100	5%	1/10W
R413	1-216-059-00	METAL GLAZE	2.7K	5%	1/10W
R414	1-216-025-00	METAL GLAZE	100	5%	1/10W
R415	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R416	1-216-647-11	METAL CHIP	680	0.50%	1/10W
R417	1-216-651-11	METAL CHIP	1K	0.50%	1/10W
R418	1-216-623-11	METAL CHIP	68	0.50%	1/10W
R419	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R420	1-216-025-00	METAL GLAZE	100	5%	1/10W
R421	1-216-025-00	METAL GLAZE	100	5%	1/10W
R422	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R423	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R424	1-216-025-00	METAL GLAZE	100	5%	1/10W
R439	1-216-111-00	METAL GLAZE	390K	5%	1/10W
R440	1-216-103-00	METAL GLAZE	180K	5%	1/10W
R442	1-216-067-00	METAL GLAZE	5.6K	5%	1/10W
R443	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R446	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R447	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R448	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R449	1-216-025-00	METAL GLAZE	100	5%	1/10W
R450	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R451	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R452	1-216-027-00	METAL GLAZE	120	5%	1/10W
R453	1-216-025-00	METAL GLAZE	100	5%	1/10W
R454	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R455	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R456	1-216-037-00	METAL GLAZE	330	5%	1/10W
R457	1-216-025-00	METAL GLAZE	100	5%	1/10W
R458	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R459	1-216-063-00	METAL GLAZE	3.9K	5%	1/10W
R460	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R461	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R462	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R465	1-216-077-00	METAL GLAZE	15K	5%	1/10W
R466	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R467	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R468	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R469	1-216-025-00	METAL GLAZE	100	5%	1/10W
R471	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R474	1-216-101-00	METAL GLAZE	150K	5%	1/10W
R475	1-216-676-11	METAL CHIP	11K	0.50%	1/10W
R476	1-216-101-00	METAL GLAZE	150K	5%	1/10W
R477	1-216-676-11	METAL CHIP	11K	0.50%	1/10W
R480	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R481	1-216-091-00	METAL GLAZE	56K	5%	1/10W
R482	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
R483	1-216-025-00	METAL GLAZE	100	5%	1/10W
R484	1-216-101-00	METAL GLAZE	150K	5%	1/10W
R485	1-216-059-00	METAL GLAZE	2.7K	5%	1/10W
R486	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R487	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R488	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R489	1-216-041-00	METAL GLAZE	470	5%	1/10W
R490	1-216-025-00	METAL GLAZE	100	5%	1/10W
R491	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R492	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R493	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R494	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R495	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R496	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R497	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R498	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R499	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R505	1-215-932-11	METAL OXIDE	22	5%	5W F
R507	1-216-493-11	METAL OXIDE	12	5%	5W F
R508	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R509	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R510	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R511	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R601	1-216-083-00	METAL GLAZE	27K	5%	1/10W
R602	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R603	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R604	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R605	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R606	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R607	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R646	1-216-039-00	METAL GLAZE	390	5%	1/10W
R647	1-216-039-00	METAL GLAZE	390	5%	1/10W
R648	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R649	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R717	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R718	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R719	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R720	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R721	1-216-041-00	METAL GLAZE	470	5%	1/10W
R722	1-216-027-00	METAL GLAZE	120	5%	1/10W
R723	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R724	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R725	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R726	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R727	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R728	1-216-085-00	METAL GLAZE	33K	5%	1/10W
R729	1-216-025-00	METAL GLAZE	100	5%	1/10W
R730	1-216-063-00	METAL GLAZE	3.9K	5%	1/10W
R731	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R732	1-216-083-00	METAL GLAZE	27K	5%	1/10W
R733	1-216-101-00	METAL GLAZE	150K	5%	1/10W
R734	1-216-105-00	METAL GLAZE	220K	5%	1/10W
R735	1-216-694-11	METAL CHIP	62K	0.50%	1/10W
R736	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R737	1-216-037-00	METAL GLAZE	330	5%	1/10W
R738	1-216-043-00	METAL GLAZE	560	5%	1/10W
R739	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R740	1-216-043-00	METAL GLAZE	560	5%	1/10W
R741	1-216-037-00	METAL GLAZE	330	5%	1/10W
R742	1-216-101-00	METAL GLAZE	150K	5%	1/10W
R743	1-216-101-00	METAL GLAZE	150K	5%	1/10W
R744	1-216-101-00	METAL GLAZE	150K	5%	1/10W
R745	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R746	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R747	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R748	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R749	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R750	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R751	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R752	1-216-025-00	METAL GLAZE	100	5%	1/10W
R753	1-216-025-00	METAL GLAZE	100	5%	1/10W
R754	1-216-025-00	METAL GLAZE	100	5%	1/10W
R756	1-216-033-00	METAL GLAZE	220	5%	1/10W
R801	1-216-093-00	METAL GLAZE	68K	5%	1/10W
R802	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R803	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R804	1-216-039-00	METAL GLAZE	390	5%	1/10W
R805	1-216-662-11	METAL CHIP	3K	0.50%	1/10W
R806	1-216-053-00	METAL GLAZE	1.5K	5%	1/10W
R807	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R808	1-216-041-00	METAL GLAZE	470	5%	1/10W
R809	1-216-041-00	METAL GLAZE	470	5%	1/10W
R810	1-216-113-00	METAL GLAZE	470K	5%	1/10W
R811	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R812	1-216-113-00	METAL GLAZE	470K	5%	1/10W
R813	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R814	1-216-113-00	METAL GLAZE	470K	5%	1/10W
R815	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R816	1-216-668-11	METAL CHIP	5.1K	0.50%	1/10W
R817	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R818	1-216-666-11	METAL CHIP	4.3K	0.50%	1/10W
R819	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R821	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R822	1-216-043-00	METAL GLAZE	560	5%	1/10W
R823	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R824	1-216-045-00	METAL GLAZE	680	5%	1/10W
R825	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R826	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R827	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R828	1-216-025-00	METAL GLAZE	100	5%	1/10W
R829	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R830	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R831	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R832	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R833	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R834	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R835	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R841	1-216-067-00	METAL GLAZE	5.6K	5%	1/10W
R842	1-216-083-00	METAL GLAZE	27K	5%	1/10W
R843	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R844	1-216-295-00	METAL GLAZE	0	5%	1/10W
R845	1-216-295-00	METAL GLAZE	0	5%	1/10W
R846	1-216-295-00	METAL GLAZE	0	5%	1/10W
R847	1-216-295-00	METAL GLAZE	0	5%	1/10W
R848	1-216-295-00	METAL GLAZE	0	5%	1/10W
R849	1-216-295-00	METAL GLAZE	0	5%	1/10W
R850	1-216-019-00	METAL GLAZE	56	5%	1/10W
R851	1-216-019-00	METAL GLAZE	56	5%	1/10W
R852	1-216-025-00	METAL GLAZE	100	5%	1/10W
R853	1-216-025-00	METAL GLAZE	100	5%	1/10W

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description			Remark
R854	1-216-025-00	METAL GLAZE	100	5%	1/10W
R855	1-216-025-00	METAL GLAZE	100	5%	1/10W
R856	1-216-025-00	METAL GLAZE	100	5%	1/10W
R857	1-216-025-00	METAL GLAZE	100	5%	1/10W
R858	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R859	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R1001	1-216-077-00	METAL GLAZE	15K	5%	1/10W
R1002	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R1003	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R1004	1-216-043-00	METAL GLAZE	560	5%	1/10W
R1005	1-216-045-00	METAL GLAZE	680	5%	1/10W
R1006	1-216-121-00	METAL GLAZE	1M	5%	1/10W
R1007	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R1008	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R1009	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R1010	1-216-077-00	METAL GLAZE	15K	5%	1/10W
R1011	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R1012	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R1013	1-216-043-00	METAL GLAZE	560	5%	1/10W
R1014	1-216-045-00	METAL GLAZE	680	5%	1/10W
R1015	1-216-121-00	METAL GLAZE	1M	5%	1/10W
R1016	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R1017	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R1018	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R1019	1-216-077-00	METAL GLAZE	15K	5%	1/10W
R1020	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R1021	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R1022	1-216-043-00	METAL GLAZE	560	5%	1/10W
R1023	1-216-045-00	METAL GLAZE	680	5%	1/10W
R1024	1-216-121-00	METAL GLAZE	1M	5%	1/10W
R1025	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R1026	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R1027	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R1028	1-216-017-00	METAL GLAZE	47	5%	1/10W
R1029	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R1030	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R1031	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R1032	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R1033	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R1035	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R1040	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R1046	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R1047	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R1051	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1054	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R1058	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1072	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R1073	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R1074	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R1075	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R1076	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R1077	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R1084	1-216-053-00	METAL GLAZE	1.5K	5%	1/10W
R1085	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R1113	1-216-023-00	METAL GLAZE	82	5%	1/10W
R1116	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1117	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1118	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1119	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1120	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1121	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1122	1-216-093-00	METAL GLAZE	68K	5%	1/10W
R1123	1-216-093-00	METAL GLAZE	68K	5%	1/10W
R1124	1-216-021-00	METAL GLAZE	68	5%	1/10W
R1125	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1126	1-216-047-00	METAL GLAZE	820	5%	1/10W
R1127	1-216-037-00	METAL GLAZE	330	5%	1/10W
R1128	1-216-037-00	METAL GLAZE	330	5%	1/10W
R1129	1-216-077-00	METAL GLAZE	15K	5%	1/10W
R1130	1-216-077-00	METAL GLAZE	15K	5%	1/10W
R1132	1-216-023-00	METAL GLAZE	82	5%	1/10W
R1133	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R1134	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R1135	1-216-063-00	METAL GLAZE	3.9K	5%	1/10W
R1136	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R1137	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R1138	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R1139	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R1140	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R1141	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R1142	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R1143	1-216-071-00	METAL GLAZE	8.2K	5%	1/10W
R1144	1-216-077-00	METAL GLAZE	15K	5%	1/10W
R1145	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R1146	1-216-071-00	METAL GLAZE	8.2K	5%	1/10W
R1147	1-216-077-00	METAL GLAZE	15K	5%	1/10W
R1148	1-216-035-00	METAL GLAZE	270	5%	1/10W
R1149	1-216-067-00	METAL GLAZE	5.6K	5%	1/10W
R1150	1-216-069-00	METAL GLAZE	6.8K	5%	1/10W
R1151	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R1154	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R1155	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R1156	1-216-636-11	METAL CHIP	240	0.50%	1/10W
R1157	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R1158	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1159	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R1160	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R1164	1-216-043-00	METAL GLAZE	560	5%	1/10W
R1165	1-216-041-00	METAL GLAZE	470	5%	1/10W
R1166	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1167	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1168	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R1169	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R1170	1-216-041-00	METAL GLAZE	470	5%	1/10W
R1171	1-216-043-00	METAL GLAZE	560	5%	1/10W
R1172	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1173	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1174	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R1175	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R1176	1-216-041-00	METAL GLAZE	470	5%	1/10W
R1177	1-216-043-00	METAL GLAZE	560	5%	1/10W
R1178	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1179	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R1180	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1181	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R1182	1-216-041-00	METAL GLAZE	470	5%	1/10W
R1183	1-216-043-00	METAL GLAZE	560	5%	1/10W
R1184	1-216-025-00	METAL GLAZE	100	5%	1/10W
R1185	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R1186	1-216-025-00	METAL GLAZE	100	5%	1/10W

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
R1187	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R1188	1-216-648-11	METAL CHIP 750 0.50% 1/10W	
R1189	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R1190	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R1192	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R1193	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R1194	1-216-069-00	METAL GLAZE 6.8K 5% 1/10W	
R1195	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R1196	1-216-063-00	METAL GLAZE 3.9K 5% 1/10W	
R1197	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R1198	1-216-295-00	METAL GLAZE 0 5% 1/10W	
R1199	1-216-295-00	METAL GLAZE 0 5% 1/10W	
R1200	1-216-085-00	METAL GLAZE 33K 5% 1/10W	
R1201	1-216-085-00	METAL GLAZE 33K 5% 1/10W	
R1202	1-216-085-00	METAL GLAZE 33K 5% 1/10W	
R1203	1-216-015-00	METAL GLAZE 39 5% 1/10W	
R1204	1-216-015-00	METAL GLAZE 39 5% 1/10W	
R2041	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
		<VARIABLE RESISTOR>	
RV1	1-228-993-00	RES, ADJ, METAL GLAZE 4.7K	
RV2	1-228-990-00	RES, ADJ, METAL GLAZE 1K	
RV3	1-228-993-00	RES, ADJ, METAL GLAZE 4.7K	
RV4	1-228-990-00	RES, ADJ, METAL GLAZE 1K	
RV6	1-228-990-00	RES, ADJ, METAL GLAZE 1K	
RV7	1-228-991-00	RES, ADJ, METAL GLAZE 2.2K	
RV8	1-228-991-00	RES, ADJ, METAL GLAZE 2.2K	
RV9	1-228-991-00	RES, ADJ, METAL GLAZE 2.2K	
RV10	1-228-993-00	RES, ADJ, METAL GLAZE 4.7K	
RV14	1-228-990-00	RES, ADJ, METAL GLAZE 1K	
RV15	1-237-516-21	RES, ADJ, METAL FILM 2K	
RV16	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV201	1-228-993-00	RES, ADJ, METAL GLAZE 4.7K	
RV203	1-228-993-00	RES, ADJ, METAL GLAZE 4.7K	
RV204	1-228-995-00	RES, ADJ, METAL GLAZE 22K	
RV302	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV303	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV304	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV305	1-237-514-21	RES, ADJ, METAL FILM 500	
RV307	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV308	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV309	1-228-991-00	RES, ADJ, METAL GLAZE 2.2K	
RV311	1-228-994-00	RES, ADJ, METAL GLAZE 10K	
RV312	1-237-514-21	RES, ADJ, METAL FILM 500	
RV313	1-228-991-00	RES, ADJ, METAL GLAZE 2.2K	
RV314	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV315	1-228-990-00	RES, ADJ, METAL GLAZE 1K	
RV316	1-228-991-00	RES, ADJ, METAL GLAZE 2.2K	
RV317	1-228-995-00	RES, ADJ, METAL GLAZE 22K	
RV318	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV601	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV1001	1-228-991-00	RES, ADJ, METAL GLAZE 2.2K	
RV1002	1-228-991-00	RES, ADJ, METAL GLAZE 2.2K	
RV1003	1-228-991-00	RES, ADJ, METAL GLAZE 2.2K	
RV1004	1-230-504-11	RES, ADJ, METAL GLAZE 220	
RV1005	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV1006	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV1007	1-228-991-00	RES, ADJ, METAL GLAZE 2.2K	
RV1008	1-228-990-00	RES, ADJ, METAL GLAZE 1K	
RV1009	1-228-989-00	RES, ADJ, METAL GLAZE 470	

Ref.No	Part No.	Description	Remark
RV1010	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV1011	1-228-989-00	RES, ADJ, METAL GLAZE 470	
RV1012	1-228-989-00	RES, ADJ, METAL GLAZE 470	
		<SWITCH>	
S301	1-570-856-11	SWITCH, SLIDE	
		<TRANSFORMER>	
T1301	1-425-786-00	TRANSFORMER, BANDPASS(BPT)	
		<CRYSTAL>	
X301	1-567-859-11	VIBRATOR, CRYSTAL	
X1001	1-567-866-11	VIBRATOR, CRYSTAL	

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*A-8271-104-A FMY-8 BOARD, COMPLETE (5100)
*A-8271-105-A FMY-8 BOARD, COMPLETE (5150)
****

<CAPACITOR>

C1	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C2	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C3	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C4	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C5	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C6	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C7	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C8	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C9	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C10	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C11	1-163-227-11	CERAMIC CHIP 10PF 5% 50V	
C12	1-163-241-11	CERAMIC CHIP 39PF 5% 50V	
C13	1-163-109-00	CERAMIC CHIP 47PF 5% 50V	
C14	1-163-109-00	CERAMIC CHIP 47PF 5% 50V	
C15	1-163-109-00	CERAMIC CHIP 47PF 5% 50V	
C16	1-163-105-00	CERAMIC CHIP 33PF 5% 50V	
C17	1-163-105-00	CERAMIC CHIP 33PF 5% 50V	
C18	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C19	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C20	1-163-235-11	CERAMIC CHIP 22PF 5% 50V	
C22	1-124-455-00	ELECT 100MF 20% 16V	
C23	1-124-455-00	ELECT 100MF 20% 16V	
C24	1-163-263-11	CERAMIC CHIP 330PF 5% 50V	
C25	1-163-009-11	CERAMIC CHIP 0.001MF 10% 50V	
C26	1-124-455-00	ELECT 100MF 20% 16V	
C27	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C28	1-124-455-00	ELECT 100MF 20% 16V	
C29	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C30	1-124-455-00	ELECT 100MF 20% 16V	
C31	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C32	1-124-455-00	ELECT 100MF 20% 16V	
C33	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C34	1-124-455-00	ELECT 100MF 20% 16V	
C35	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C36	1-124-455-00	ELECT 100MF 20% 16V	
C37	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C38	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C39	1-124-455-00	ELECT 100MF 20% 16V	

When indicating parts by reference number, please include the board name.

FMY-8

Ref.No	Part No.	Description			Remark
C40	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C41	1-124-455-00	ELECT	100MF	20%	16V
C42	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C46	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C47	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C48	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C49	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C50	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C51	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C52	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C53	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C54	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C55	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C56	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C57	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C58	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C59	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C60	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C61	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C62	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C63	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C64	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C65	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C66	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C67	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C68	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C69	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C70	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C71	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C72	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C73	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C74	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C75	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C76	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C77	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C78	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C79	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C80	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C81	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C82	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C83	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C84	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C85	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C86	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C87	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C88	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C89	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C90	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C91	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C92	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C93	1-124-589-11	ELECT	47MF	20%	16V
C94	1-124-589-11	ELECT	47MF	20%	16V
C95	1-124-589-11	ELECT	47MF	20%	16V
C96	1-124-589-11	ELECT	47MF	20%	16V
C97	1-124-589-11	ELECT	47MF	20%	16V
C98	1-124-589-11	ELECT	47MF	20%	16V
C99	1-124-589-11	ELECT	47MF	20%	16V
C100	1-124-589-11	ELECT	47MF	20%	16V
C101	1-124-589-11	ELECT	47MF	20%	16V
C102	1-124-589-11	ELECT	47MF	20%	16V

Ref.No	Part No.	Description			Remark
C103	1-124-589-11	ELECT	47MF	20%	16V
C104	1-124-589-11	ELECT	47MF	20%	16V
C105	1-124-589-11	ELECT	47MF	20%	16V
C106	1-124-589-11	ELECT	47MF	20%	16V
C107	1-124-589-11	ELECT	47MF	20%	16V
C108	1-124-589-11	ELECT	47MF	20%	16V
C109	1-124-589-11	ELECT	47MF	20%	16V
C110	1-124-589-11	ELECT	47MF	20%	16V
C111	1-124-589-11	ELECT	47MF	20%	16V
C112	1-124-589-11	ELECT	47MF	20%	16V
C113	1-124-589-11	ELECT	47MF	20%	16V
C114	1-124-589-11	ELECT	47MF	20%	16V
C115	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C116	1-124-589-11	ELECT	47MF	20%	16V
C117	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C118	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C119	1-163-038-00	CERAMIC CHIP	0.1MF		25V
		<CONNECTOR>			
CN1	*1-568-935-11	PIN. CONNECTOR 8P			
CN2	*1-573-912-11	PIN. CONNECTOR 14P			
CN3	*1-568-939-11	PIN. CONNECTOR 12P			
		<CERAMIC TRIMMER>			
CT1	1-141-245-00	TRIMMER. CERAMIC			
		<FILTER>			
FL1	1-236-163-11	ENCAPSULATED COMPONENT			
FL2	1-236-163-11	ENCAPSULATED COMPONENT			
FL3	1-236-163-11	ENCAPSULATED COMPONENT			
FL6	1-236-163-11	ENCAPSULATED COMPONENT			
FL7	1-236-163-11	ENCAPSULATED COMPONENT			
FL8	1-236-163-11	ENCAPSULATED COMPONENT			
FL9	1-236-163-11	ENCAPSULATED COMPONENT			
FL10	1-236-163-11	ENCAPSULATED COMPONENT			
FL11	1-236-163-11	ENCAPSULATED COMPONENT			
FL12	1-236-163-11	ENCAPSULATED COMPONENT			
		<IC>			
IC1	8-752-334-55	IC CXD1175AM			
IC2	8-752-334-55	IC CXD1175AM			
IC3	8-752-334-55	IC CXD1175AM			
IC4	8-759-114-09	IC UPD65006GF-250-3B8			
IC5	8-759-140-94	IC CXD1332P			
IC6	8-759-060-72	IC DS1000M-75			
IC7	8-759-154-50	IC CXD8301Q			
IC8	8-759-916-25	IC SN74HC32ANS			
		- UP-5100 ONLY -			
IC9	8-759-323-59	IC HM514256AZP-8			
IC10	8-759-323-59	IC HM514256AZP-8			
IC11	8-759-323-59	IC HM514256AZP-8			
IC12	8-759-323-59	IC HM514256AZP-8			
IC13	8-759-323-59	IC HM514256AZP-8			
IC14	8-759-323-59	IC HM514256AZP-8			
IC15	8-759-323-59	IC HM514256AZP-8			
IC16	8-759-323-59	IC HM514256AZP-8			
IC17	8-759-323-59	IC HM514256AZP-8			
IC18	8-759-323-59	IC HM514256AZP-8			
IC19	8-759-323-59	IC HM514256AZP-8			

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
IC20	8-759-323-59	IC HM514256AZP-8	
		- UP-5150 ONLY -	
IC9	8-759-043-60	IC HM51H240AZ7	
IC10	8-759-043-60	IC HM51H240AZ7	
IC11	8-759-043-60	IC HM51H240AZ7	
IC12	8-759-043-60	IC HM51H240AZ7	
IC13	8-759-043-60	IC HM51H240AZ7	
IC14	8-759-043-60	IC HM51H240AZ7	
IC15	8-759-043-60	IC HM51H240AZ7	
IC16	8-759-043-60	IC HM51H240AZ7	
IC17	8-759-043-60	IC HM51H240AZ7	
IC18	8-759-043-60	IC HM51H240AZ7	
IC19	8-759-043-60	IC HM51H240AZ7	
IC20	8-759-043-60	IC HM51H240AZ7	
IC21	8-759-033-44	IC MC74F245M	
IC22	8-759-033-44	IC MC74F245M	
IC23	8-759-033-44	IC MC74F245M	
IC24	8-759-033-48	IC MC74F257M	
IC25	8-759-239-23	IC TC74HC86AF	
IC26	8-759-916-25	IC SN74HC32ANS	
IC27	8-759-925-74	IC SN74HC04ANS	
IC28	8-759-059-92	IC HD6435328RB13F	
IC29	8-759-114-07	IC UPD65013GF-407-3BA	
IC30	8-759-053-96	IC CXD8328Q	
IC32	8-759-925-76	IC SN74HC08ANS	
IC33	8-759-514-88	IC IDT6116SA35TP	
IC34	8-759-514-88	IC IDT6116SA35TP	
IC35	8-759-514-88	IC IDT6116SA35TP	
IC36	8-759-154-50	IC CXD8301Q	
IC37	8-759-057-50	IC HN62302BF-Z11	
IC38	8-759-057-51	IC HN62302BF-Z12	
IC39	8-759-926-82	IC SN74HC574ANS	
IC40	8-759-926-77	IC SN74HC541ANS	
IC41	8-759-926-77	IC SN74HC541ANS	
IC42	8-759-926-77	IC SN74HC541ANS	
IC43	8-759-112-06	IC UPC78N05H	
IC44	8-759-154-50	IC CXD8301Q	
IC45	8-759-154-50	IC CXD8301Q	
IC46	8-752-032-93	IC CXA1260Q-Z	
IC47	8-759-033-24	IC MC74F139M	
IC48	8-759-057-52	IC HN62302BF-Z13	
IC49	8-759-060-71	IC CXD8327Q	
		<INDUCTOR>	
L1	1-407-169-XX	INDUCTOR 100UH	
L3	1-412-525-21	INDUCTOR 10UH	
L4	1-412-525-21	INDUCTOR 10UH	
L5	1-412-525-21	INDUCTOR 10UH	
L6	1-407-169-XX	INDUCTOR 100UH	
L7	1-407-169-XX	INDUCTOR 100UH	
L8	1-407-169-XX	INDUCTOR 100UH	
		<TRANSISTOR>	
Q1	8-729-967-32	TRANSISTOR 2SC2673	
Q2	8-729-967-32	TRANSISTOR 2SC2673	
Q3	8-729-967-32	TRANSISTOR 2SC2673	

Ref.No	Part No.	Description	Remark
		<RESISTOR>	
R1	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R2	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R3	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R4	1-216-119-00	METAL GLAZE 820K 5% 1/10W	
R5	1-216-121-00	METAL GLAZE 1M 5% 1/10W	
R7	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R8	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R9	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R10	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R11	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R12	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R13	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R14	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R15	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R16	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R17	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R18	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R19	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R20	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R21	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R22	1-216-037-00	METAL GLAZE 330 5% 1/10W	
R23	1-216-037-00	METAL GLAZE 330 5% 1/10W	
R24	1-216-037-00	METAL GLAZE 330 5% 1/10W	
R25	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
R26	1-216-001-00	METAL GLAZE 10 5% 1/10W	
R27	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
R28	1-216-001-00	METAL GLAZE 10 5% 1/10W	
R29	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
R30	1-216-001-00	METAL GLAZE 10 5% 1/10W	
R31	1-216-041-00	METAL GLAZE 470 5% 1/10W	
R32	1-216-053-00	METAL GLAZE 1.5K 5% 1/10W	
R33	1-216-001-00	METAL GLAZE 10 5% 1/10W	
R34	1-216-001-00	METAL GLAZE 10 5% 1/10W	
R35	1-216-001-00	METAL GLAZE 10 5% 1/10W	
R36	1-216-121-00	METAL GLAZE 1M 5% 1/10W	
R37	1-216-061-00	METAL GLAZE 3.3K 5% 1/10W	
R38	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R39	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R40	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R43	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R44	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R45	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R46	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R47	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R48	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R49	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R50	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R51	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R52	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R53	1-216-037-00	METAL GLAZE 330 5% 1/10W	
R54	1-216-045-00	METAL GLAZE 680 5% 1/10W	
R55	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R56	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R57	1-247-734-81	CARBON 39 5% 1/2W	F
		<RESISTOR BLOCK>	
RB1	1-231-405-00	RESISTOR BLOCK 1K	
RB2	1-231-405-00	RESISTOR BLOCK 1K	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
RB3	1-231-405-00	RESISTOR BLOCK 1K	
RB4	1-231-385-00	RESISTOR BLOCK 4.7K	
RB5	1-231-385-00	RESISTOR BLOCK 4.7K	
RB6	1-231-385-00	RESISTOR BLOCK 4.7K	
		<CRYSTAL>	
X1	1-567-878-11	VIBRATOR, CRYSTAL 14.318MHz	
X2	1-577-110-11	VIBRATOR, CRYSTAL 20MHz	

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*A-8271-102-A SY-9 BOARD, COMPLETE (5100)
*A-8271-113-A SY-9 BOARD, COMPLETE (5150)
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Ref.No	Part No.	Description	Remark
	*1-526-659-00	SOCKET, IC (DP) 28P	
	1-526-660-21	SOCKET, IC (DP) 32P	
	*1-535-199-11	TERMINAL, SOLDERLESS	
		<CAPACITOR>	
C1	1-124-480-11	ELECT 470MF 20%	25V
C2	1-124-480-11	ELECT 470MF 20%	25V
C3	1-124-477-11	ELECT 47MF 20%	16V
C4	1-163-009-11	CERAMIC CHIP 0.001MF 10%	50V
C5	1-124-907-11	ELECT 10MF 20%	50V
C6	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C7	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C8	1-124-126-00	ELECT 47MF 20%	10V
C9	1-164-161-11	CERAMIC CHIP 0.0022MF	50V
C10	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C11	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C12	1-163-009-11	CERAMIC CHIP 0.001MF 10%	50V
C13	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C14	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C15	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C16	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C17	1-163-101-00	CERAMIC CHIP 22PF 5%	50V
C18	1-163-101-00	CERAMIC CHIP 22PF 5%	50V
C19	1-124-902-00	ELECT 0.47MF 20%	50V
C20	1-124-902-00	ELECT 0.47MF 20%	50V
C21	1-163-005-11	CERAMIC CHIP 470PF 10%	50V
C22	1-163-009-11	CERAMIC CHIP 0.001MF 10%	50V
C23	1-163-009-11	CERAMIC CHIP 0.001MF 10%	50V
C24	1-163-101-00	CERAMIC CHIP 22PF 5%	50V
C25	1-163-101-00	CERAMIC CHIP 22PF 5%	50V
C26	1-163-009-11	CERAMIC CHIP 0.001MF 10%	50V
C27	1-124-126-00	ELECT 47MF 20%	10V
C28	1-163-009-11	CERAMIC CHIP 0.001MF 10%	50V
C29	1-163-117-00	CERAMIC CHIP 100PF 5%	50V
C30	1-163-009-11	CERAMIC CHIP 0.001MF 10%	50V
C31	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C32	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C33	1-163-117-00	CERAMIC CHIP 100PF 5%	50V
C34	1-163-117-00	CERAMIC CHIP 100PF 5%	50V
C35	1-163-117-00	CERAMIC CHIP 100PF 5%	50V
C36	1-163-009-11	CERAMIC CHIP 0.001MF 10%	50V
C37	1-163-009-11	CERAMIC CHIP 0.001MF 10%	50V
C38	1-163-101-00	CERAMIC CHIP 22PF 5%	50V
C39	1-163-101-00	CERAMIC CHIP 22PF 5%	50V
C40	1-163-009-11	CERAMIC CHIP 0.001MF 10%	50V
C41	1-124-477-11	ELECT 47MF 20%	16V
C42	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C43	1-124-907-11	ELECT 10MF 20%	50V
C44	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C45	1-124-907-11	ELECT 10MF 20%	50V
C46	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C47	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C48	1-124-443-00	ELECT 100MF 20%	6.3V
C49	1-124-443-00	ELECT 100MF 20%	6.3V
C50	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C51	1-124-126-00	ELECT 47MF 20%	10V
C52	1-124-126-00	ELECT 47MF 20%	10V
C53	1-124-126-00	ELECT 47MF 20%	10V
C54	1-124-126-00	ELECT 47MF 20%	10V
C61	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C62	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C63	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C64	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C65	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C66	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C67	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C68	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C69	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C70	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C71	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C72	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C73	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C74	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C75	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C76	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C77	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C78	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C79	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C80	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C81	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C82	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C83	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C84	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C85	1-163-033-00	CERAMIC CHIP 0.022MF	50V
C101	1-163-117-00	CERAMIC CHIP 100PF 5%	50V
C105	1-163-009-11	CERAMIC CHIP 0.001MF 10%	50V
C106	1-163-009-11	CERAMIC CHIP 0.001MF 10%	50V
C107	1-163-009-11	CERAMIC CHIP 0.001MF 10%	50V
C108	1-163-117-00	CERAMIC CHIP 100PF 5%	50V
		<CONNECTOR>	
CN1	*1-568-935-11	PIN, CONNECTOR 8P	
CN2	*1-568-937-11	PIN, CONNECTOR 10P	
CN3	*1-568-935-11	PIN, CONNECTOR 8P	
CN4	*1-568-935-11	PIN, CONNECTOR 8P	
CN5	*1-568-939-41	PIN, CONNECTOR 12P	
CN6	*1-568-955-91	PIN, CONNECTOR (STRAIGHT) 6P	
CN7	*1-568-954-11	PIN, CONNECTOR 5P	
CN8	*1-568-937-11	PIN, CONNECTOR 10P	
CN9	*1-560-894-00	PIN, CONNECTOR 6P	
CN10	*1-568-951-11	PIN, CONNECTOR 2P	
CN11	*1-568-951-11	PIN, CONNECTOR 2P	
CN12	*1-560-891-00	PIN, CONNECTOR 3P	
CN13	*1-506-468-11	PIN, CONNECTOR 3P	
CN14	*1-568-951-11	PIN, CONNECTOR 2P	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
CN15	*1-568-955-11	PIN, CONNECTOR 6P	
CN16	*1-568-951-11	PIN, CONNECTOR 2P	
CN17	*1-568-951-11	PIN, CONNECTOR 2P	
CN18	*1-568-951-11	PIN, CONNECTOR 2P	
CN19	*1-568-951-91	PIN, CONNECTOR (STRAIGHT) 2P	
CN20	*1-568-951-11	PIN, CONNECTOR 2P	
CN21	*1-506-468-11	PIN, CONNECTOR 3P	
CN22	*1-568-952-11	PIN, CONNECTOR (STRAIGHT) 3P	
CN30	*1-562-719-11	SOCKET, CONNECTOR 10P	
CN40	*1-506-468-11	PIN, CONNECTOR 3P	
CN41	*1-568-951-11	PIN, CONNECTOR 2P	
		<DIODE>	
D1	8-719-200-02	DIODE 10E-2	
D2	8-719-200-02	DIODE 10E-2	
D3	8-719-104-34	DIODE 1S2836	
D4	8-719-104-34	DIODE 1S2836	
D5	8-719-104-34	DIODE 1S2836	
D6	8-719-104-34	DIODE 1S2836	
D7	8-719-104-34	DIODE 1S2836	
D9	8-719-104-34	DIODE 1S2836	
D11	8-719-104-34	DIODE 1S2836	
		<FILTER>	
FL1	1-236-058-11	ENCAPSULATED COMPONENT	
FL2	1-236-058-11	ENCAPSULATED COMPONENT	
FL3	1-236-058-11	ENCAPSULATED COMPONENT	
FL4	1-236-058-11	ENCAPSULATED COMPONENT	
FL5	1-236-058-11	ENCAPSULATED COMPONENT	
		<IC>	
IC1	8-759-043-40	IC UPD78310AGF-3BE	
IC2	8-759-148-14	IC UPD71055GB-3B4	
IC3	8-759-988-66	IC MB89371APF	
IC4	8-759-065-57	IC AM27C512-SY9NV1.1	
IC5	8-759-058-91	IC HN27C101AP-SY9GV1.0	
IC6	8-752-322-06	IC CXK5814P-35	
IC7	8-752-322-06	IC CXK5814P-35	
IC8	8-752-322-06	IC CXK5814P-35	
IC9	8-752-321-18	IC CXK1005P	
IC10	8-752-321-18	IC CXK1005P	
IC11	8-759-154-84	IC HDC443V2	
IC12	8-759-988-27	IC SN75188NS	
IC13	8-759-988-24	IC SN75189ANS	
IC14	8-795-926-80	IC SN74HC573BNS	
IC15	8-795-926-80	IC SN74HC573BNS	
IC16	8-759-926-12	IC SN74HC139ANS	
IC17	8-759-926-12	IC SN74HC139ANS	
IC18	8-759-970-26	IC PST523C	
IC19	8-759-600-24	IC M54543L	
IC20	8-759-925-76	IC SN74HC08ANS	
IC21	8-759-916-25	IC SN74HC32ANS	
IC22	8-759-926-48	IC SN74HC244ANS	
IC23	8-759-926-44	IC SN74HC240ANS	
IC24	8-759-925-74	IC SN74HC04ANS	
IC25	8-759-925-74	IC SN74HC04ANS	
IC26	8-759-100-95	IC UPC324G2	
IC27	8-759-100-93	IC UPC393G2	
IC28	8-759-100-97	IC UPC339G2	
IC29	8-759-926-44	IC SN74HC240ANS	

Ref.No	Part No.	Description	Remark
		<INDUCTOR>	
L1	1-412-532-11	INDUCTOR 39UH	
		<TRANSISTOR>	
Q1	8-729-901-04	TRANSISTOR DTA114EK	
Q2	8-729-901-00	TRANSISTOR DTC124EK	
Q3	8-729-177-22	TRANSISTOR 2SB772-Q	
Q4	8-729-177-22	TRANSISTOR 2SB772-Q	
Q5	8-729-101-73	TRANSISTOR 2SD992A-P	
Q6	8-729-101-73	TRANSISTOR 2SD992A-P	
Q7	8-729-101-73	TRANSISTOR 2SD992A-P	
Q8	8-729-101-73	TRANSISTOR 2SD992A-P	
Q9	8-729-101-73	TRANSISTOR 2SD992A-P	
Q10	8-729-101-73	TRANSISTOR 2SD992A-P	
Q11	8-729-100-66	TRANSISTOR 2SC1623	
Q12	8-729-100-66	TRANSISTOR 2SC1623	
		<RESISTOR>	
R1	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R2	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R3	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R4	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R5	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R6	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R7	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R8	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R9	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R10	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R11	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R12	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R13	1-207-678-00	WIREWOUND 10 10% 5W	F
R14	1-207-678-00	WIREWOUND 10 10% 5W	F
R15	1-207-678-00	WIREWOUND 10 10% 5W	F
R16	1-249-385-11	CARBON 2.2 5% 1/4W	
R17	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R18	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R19	1-260-099-11	CARBON 1K 5% 1/2W	
R20	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R21	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R22	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R23	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R24	1-249-390-11	CARBON 5.6 5% 1/4W	
R25	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R26	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R27	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R28	1-216-037-00	METAL GLAZE 330 5% 1/10W	
R29	1-216-093-00	METAL GLAZE 68K 5% 1/10W	
R30	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R31	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R32	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R33	1-216-037-00	METAL GLAZE 330 5% 1/10W	
R34	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R35	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R36	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R37	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R38	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R39	1-216-101-00	METAL GLAZE 150K 5% 1/10W	
R40	1-216-049-00	METAL GLAZE 1K 5% 1/10W	

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description	Remark
R42	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R43	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R44	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R45	1-216-037-00	METAL GLAZE 330 5% 1/10W	
R46	1-216-093-00	METAL GLAZE 68K 5% 1/10W	
R47	1-216-037-00	METAL GLAZE 330 5% 1/10W	
R48	1-216-093-00	METAL GLAZE 68K 5% 1/10W	
R49	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R50	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R51	1-216-063-00	METAL GLAZE 3.9K 5% 1/10W	
R52	1-216-067-00	METAL GLAZE 5.6K 5% 1/10W	
R53	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R54	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R55	1-216-121-00	METAL GLAZE 1M 5% 1/10W	
R56	1-216-121-00	METAL GLAZE 1M 5% 1/10W	
R57	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R58	1-216-037-00	METAL GLAZE 330 5% 1/10W	
R59	1-216-083-00	METAL GLAZE 27K 5% 1/10W	
R60	1-216-037-00	METAL GLAZE 330 5% 1/10W	
R61	1-216-079-00	METAL GLAZE 18K 5% 1/10W	
R62	1-216-069-00	METAL GLAZE 6.8K 5% 1/10W	
R63	1-216-063-00	METAL GLAZE 3.9K 5% 1/10W	
R64	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R65	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R66	1-216-105-00	METAL GLAZE 220K 5% 1/10W	
R67	1-216-105-00	METAL GLAZE 220K 5% 1/10W	
R68	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R69	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R70	1-216-037-00	METAL GLAZE 330 5% 1/10W	
R71	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R72	1-216-037-00	METAL GLAZE 330 5% 1/10W	
R73	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R74	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R75	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R76	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R77	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R78	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R79	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R80	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R81	1-216-121-00	METAL GLAZE 1M 5% 1/10W	
R82	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R83	1-216-101-00	METAL GLAZE 150K 5% 1/10W	
R84	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R85	1-216-101-00	METAL GLAZE 150K 5% 1/10W	
R86	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R87	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R88	1-216-295-00	METAL GLAZE 0 5% 1/10W	
R89	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R90	1-216-043-00	METAL GLAZE 560 5% 1/10W	
R91	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R92	1-216-075-00	METAL GLAZE 12K 5% 1/10W	
R93	1-216-075-00	METAL GLAZE 12K 5% 1/10W	
R94	1-216-075-00	METAL GLAZE 12K 5% 1/10W	
R95	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R96	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R97	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R98	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R99	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R100	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R101	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R102	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R103	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R104	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R105	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R106	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R107	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R108	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R109	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R110	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R111	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R112	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R113	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R114	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R115	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R116	1-216-748-11	METAL GLAZE 39K 5% 1/10W	
R117	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R118	1-216-069-00	METAL GLAZE 6.8K 5% 1/10W	
R119	1-216-045-00	METAL GLAZE 680 5% 1/10W	
R120	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R121	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R132	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R133	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R134	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R135	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R136	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R137	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R140	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R141	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R143	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R144	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R145	1-216-121-00	METAL GLAZE 1M 5% 1/10W	
R146	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R147	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R148	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R149	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R150	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R151	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R152	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R153	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R154	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R155	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R156	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R157	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
R158	1-216-055-00	METAL GLAZE 1.8K 5% 1/10W	
R159	1-216-091-00	METAL GLAZE 56K 5% 1/10W	
R160	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R161	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R162	1-216-069-00	METAL GLAZE 6.8K 5% 1/10W	
R163	1-216-748-11	METAL GLAZE 39K 5% 1/10W	
R164	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R165	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R166	1-216-105-00	METAL GLAZE 220K 5% 1/10W	
		<VARIABLE RESISTOR>	
RV1	1-238-784-11	RES. ADJ. CERMET 1K	
		<SWITCH>	
S1	1-553-856-00	SWITCH. KEY BOARD	
S3	1-553-856-00	SWITCH. KEY BOARD	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
S4	1-553-856-00	SWITCH, KEY BOARD			
S5	1-570-856-11	SWITCH, SLIDE			
S6	1-570-856-11	SWITCH, SLIDE			

<THERMISTER>

Ref.No	Part No.	Description			Remark
TH1	1-800-202-XX	THERMISTOR S-10K			

<CRYSTAL>

Ref.No	Part No.	Description			Remark
X1	1-567-862-11	VIBRATOR, CRYSTAL 4.9152MHz			
X2	1-567-865-11	VIBRATOR, CRYSTAL 12MHz			
X3	1-577-076-11	VIBRATOR, CRYSTAL 16MHz			

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*A-8271-103-A IF-19 BOARD, COMPLETE

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<CAPACITOR>

Ref.No	Part No.	Description			Remark
C101	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C102	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C103	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C104	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C105	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C106	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C107	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C108	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C109	1-124-234-00	ELECT	22MF	20%	16V
C110	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C111	1-124-234-00	ELECT	22MF	20%	16V
C112	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C200	1-124-234-00	ELECT	22MF	20%	16V
C201	1-124-234-00	ELECT	22MF	20%	16V
C202	1-124-234-00	ELECT	22MF	20%	16V
C203	1-124-234-00	ELECT	22MF	20%	16V
C204	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C205	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C206	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C207	1-124-234-00	ELECT	22MF	20%	16V
C208	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C209	1-124-234-00	ELECT	22MF	20%	16V
C210	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C211	1-124-234-00	ELECT	22MF	20%	16V
C212	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C300	1-124-234-00	ELECT	22MF	20%	16V
C301	1-124-234-00	ELECT	22MF	20%	16V
C302	1-124-234-00	ELECT	22MF	20%	16V
C303	1-124-234-00	ELECT	22MF	20%	16V
C304	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C305	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C306	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C307	1-124-234-00	ELECT	22MF	20%	16V
C308	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C309	1-124-234-00	ELECT	22MF	20%	16V
C310	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C311	1-124-234-00	ELECT	22MF	20%	16V
C312	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C400	1-124-234-00	ELECT	22MF	20%	16V
C401	1-124-234-00	ELECT	22MF	20%	16V
C402	1-124-234-00	ELECT	22MF	20%	16V
C403	1-124-234-00	ELECT	22MF	20%	16V
C404	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C405	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C406	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C407	1-124-234-00	ELECT	22MF	20%	16V
C408	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C409	1-124-234-00	ELECT	22MF	20%	16V
C410	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C411	1-124-234-00	ELECT	22MF	20%	16V
C412	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C500	1-124-234-00	ELECT	22MF	20%	16V
C501	1-124-234-00	ELECT	22MF	20%	16V
C502	1-124-234-00	ELECT	22MF	20%	16V
C503	1-124-234-00	ELECT	22MF	20%	16V
C504	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C505	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C506	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C507	1-124-234-00	ELECT	22MF	20%	16V
C508	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C509	1-124-234-00	ELECT	22MF	20%	16V
C510	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C511	1-124-234-00	ELECT	22MF	20%	16V
C512	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C600	1-124-234-00	ELECT	22MF	20%	16V
C601	1-124-234-00	ELECT	22MF	20%	16V
C602	1-124-234-00	ELECT	22MF	20%	16V
C603	1-124-234-00	ELECT	22MF	20%	16V
C604	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C605	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C606	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C607	1-124-234-00	ELECT	22MF	20%	16V
C608	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C609	1-124-234-00	ELECT	22MF	20%	16V
C610	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C611	1-124-234-00	ELECT	22MF	20%	16V
C612	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C700	1-124-234-00	ELECT	22MF	20%	16V
C701	1-124-234-00	ELECT	22MF	20%	16V
C702	1-124-234-00	ELECT	22MF	20%	16V
C703	1-124-234-00	ELECT	22MF	20%	16V
C704	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C705	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C706	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C707	1-124-234-00	ELECT	22MF	20%	16V
C708	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C709	1-124-234-00	ELECT	22MF	20%	16V
C710	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C711	1-124-234-00	ELECT	22MF	20%	16V
C712	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C801	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C802	1-126-177-11	ELECT	100MF	20%	10V
C803	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C804	1-126-177-11	ELECT	100MF	20%	10V
C805	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C806	1-126-177-11	ELECT	100MF	20%	10V
C807	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C808	1-126-177-11	ELECT	100MF	20%	10V
C810	1-126-177-11	ELECT	100MF	20%	10V
C811	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C812	1-163-038-00	CERAMIC CHIP	0.1MF		25V

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description	Remark
		<CONNECTOR>	
CN101	*1-569-803-11	CONNECTOR, (S) TERMINAL 4P	
CN102	*1-569-803-11	CONNECTOR, (S) TERMINAL 4P	
CN103	*1-568-942-11	PIN, CONNECTOR 4P	
CN104	*1-568-942-11	PIN, CONNECTOR 4P	
CN303	*1-568-940-11	PIN, CONNECTOR 2P	
CN304	*1-568-940-11	PIN, CONNECTOR 2P	
CN403	*1-568-946-11	PIN, CONNECTOR 8P	
CN404	*1-568-946-11	PIN, CONNECTOR 8P	
CN801	*1-568-941-11	PIN, CONNECTOR 3P	
CN802	*1-568-942-11	PIN, CONNECTOR 4P	
		<DIODE>	
D101	8-719-106-23	DIODE RD7.5M-B2	
D102	8-719-400-18	DIODE MA152WK	
D103	8-719-106-23	DIODE RD7.5M-B2	
D104	8-719-106-23	DIODE RD7.5M-B2	
D201	8-719-106-23	DIODE RD7.5M-B2	
D202	8-719-400-18	DIODE MA152WK	
D203	8-719-106-23	DIODE RD7.5M-B2	
D204	8-719-106-23	DIODE RD7.5M-B2	
D301	8-719-106-23	DIODE RD7.5M-B2	
D302	8-719-400-18	DIODE MA152WK	
D303	8-719-106-23	DIODE RD7.5M-B2	
D304	8-719-106-23	DIODE RD7.5M-B2	
D401	8-719-106-23	DIODE RD7.5M-B2	
D402	8-719-400-18	DIODE MA152WK	
D403	8-719-106-23	DIODE RD7.5M-B2	
D404	8-719-106-23	DIODE RD7.5M-B2	
D501	8-719-106-23	DIODE RD7.5M-B2	
D502	8-719-400-18	DIODE MA152WK	
D503	8-719-106-23	DIODE RD7.5M-B2	
D504	8-719-106-23	DIODE RD7.5M-B2	
D601	8-719-106-23	DIODE RD7.5M-B2	
D602	8-719-400-18	DIODE MA152WK	
D603	8-719-106-23	DIODE RD7.5M-B2	
D604	8-719-106-23	DIODE RD7.5M-B2	
D701	8-719-106-23	DIODE RD7.5M-B2	
D702	8-719-400-18	DIODE MA152WK	
D703	8-719-106-23	DIODE RD7.5M-B2	
D704	8-719-106-23	DIODE RD7.5M-B2	
		<FILTER>	
FL101	1-236-101-11	ENCAPSULATED COMPONENT	
FL102	1-236-101-11	ENCAPSULATED COMPONENT	
FL201	1-236-101-11	ENCAPSULATED COMPONENT	
FL202	1-236-101-11	ENCAPSULATED COMPONENT	
FL301	1-236-101-11	ENCAPSULATED COMPONENT	
FL302	1-236-101-11	ENCAPSULATED COMPONENT	
FL401	1-236-101-11	ENCAPSULATED COMPONENT	
FL402	1-236-101-11	ENCAPSULATED COMPONENT	
FL501	1-236-101-11	ENCAPSULATED COMPONENT	
FL502	1-236-101-11	ENCAPSULATED COMPONENT	
FL601	1-236-101-11	ENCAPSULATED COMPONENT	
FL602	1-236-101-11	ENCAPSULATED COMPONENT	
FL701	1-236-101-11	ENCAPSULATED COMPONENT	
FL702	1-236-101-11	ENCAPSULATED COMPONENT	
		<IC>	
IC101	8-759-710-85	IC NJM2233BD	
IC201	8-759-710-85	IC NJM2233BD	
IC301	8-759-710-85	IC NJM2233BD	
IC401	8-759-710-85	IC NJM2233BD	
IC501	8-759-710-85	IC NJM2233BD	
IC601	8-759-710-85	IC NJM2233BD	
IC701	8-759-710-85	IC NJM2233BD	
		<INDUCTOR>	
L801	1-408-970-21	INDUCTOR 10UH	
L802	1-408-970-21	INDUCTOR 10UH	
L803	1-408-970-21	INDUCTOR 10UH	
L804	1-408-970-21	INDUCTOR 10UH	
L805	1-408-970-21	INDUCTOR 10UH	
		<TRANSISTOR>	
Q101	8-729-100-66	TRANSISTOR 2SC1623	
Q102	8-729-100-66	TRANSISTOR 2SC1623	
Q103	8-729-216-22	TRANSISTOR 2SA1162	
Q104	8-729-100-66	TRANSISTOR 2SC1623	
Q105	8-729-100-66	TRANSISTOR 2SC1623	
Q106	8-729-100-66	TRANSISTOR 2SC1623	
Q107	8-729-100-66	TRANSISTOR 2SC1623	
Q201	8-729-100-66	TRANSISTOR 2SC1623	
Q202	8-729-100-66	TRANSISTOR 2SC1623	
Q203	8-729-216-22	TRANSISTOR 2SA1162	
Q204	8-729-100-66	TRANSISTOR 2SC1623	
Q205	8-729-100-66	TRANSISTOR 2SC1623	
Q206	8-729-100-66	TRANSISTOR 2SC1623	
Q207	8-729-100-66	TRANSISTOR 2SC1623	
Q301	8-729-100-66	TRANSISTOR 2SC1623	
Q302	8-729-100-66	TRANSISTOR 2SC1623	
Q303	8-729-216-22	TRANSISTOR 2SA1162	
Q304	8-729-100-66	TRANSISTOR 2SC1623	
Q305	8-729-100-66	TRANSISTOR 2SC1623	
Q306	8-729-100-66	TRANSISTOR 2SC1623	
Q307	8-729-100-66	TRANSISTOR 2SC1623	
Q401	8-729-100-66	TRANSISTOR 2SC1623	
Q402	8-729-100-66	TRANSISTOR 2SC1623	
Q403	8-729-216-22	TRANSISTOR 2SA1162	
Q404	8-729-100-66	TRANSISTOR 2SC1623	
Q405	8-729-100-66	TRANSISTOR 2SC1623	
Q406	8-729-100-66	TRANSISTOR 2SC1623	
Q407	8-729-100-66	TRANSISTOR 2SC1623	
Q501	8-729-100-66	TRANSISTOR 2SC1623	
Q502	8-729-100-66	TRANSISTOR 2SC1623	
Q503	8-729-216-22	TRANSISTOR 2SA1162	
Q504	8-729-100-66	TRANSISTOR 2SC1623	
Q505	8-729-100-66	TRANSISTOR 2SC1623	
Q506	8-729-100-66	TRANSISTOR 2SC1623	
Q507	8-729-100-66	TRANSISTOR 2SC1623	
Q601	8-729-100-66	TRANSISTOR 2SC1623	
Q602	8-729-100-66	TRANSISTOR 2SC1623	
Q603	8-729-216-22	TRANSISTOR 2SA1162	
Q604	8-729-100-66	TRANSISTOR 2SC1623	
Q605	8-729-100-66	TRANSISTOR 2SC1623	
Q606	8-729-100-66	TRANSISTOR 2SC1623	
Q607	8-729-100-66	TRANSISTOR 2SC1623	
Q701	8-729-100-66	TRANSISTOR 2SC1623	
Q702	8-729-100-66	TRANSISTOR 2SC1623	
Q703	8-729-216-22	TRANSISTOR 2SA1162	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
Q704	8-729-100-66	TRANSISTOR 2SC1623				
Q705	8-729-100-66	TRANSISTOR 2SC1623				
Q706	8-729-100-66	TRANSISTOR 2SC1623				
Q707	8-729-100-66	TRANSISTOR 2SC1623				
Q802	8-729-100-66	TRANSISTOR 2SC1623				
		<RESISTOR>				
R101	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R102	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R103	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R104	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R105	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R106	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R107	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R108	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R109	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R110	1-216-045-00	METAL GLAZE	680	5%	1/10W	
R111	1-216-039-00	METAL GLAZE	390	5%	1/10W	
R112	1-216-077-00	METAL GLAZE	15K	5%	1/10W	
R113	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R114	1-216-085-00	METAL GLAZE	33K	5%	1/10W	
R115	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R116	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R117	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R118	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R119	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R120	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R121	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R122	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R123	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R124	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R125	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R126	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R127	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R128	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R201	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R202	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R203	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R204	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R205	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R206	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R207	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R208	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R209	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R210	1-216-045-00	METAL GLAZE	680	5%	1/10W	
R211	1-216-039-00	METAL GLAZE	390	5%	1/10W	
R212	1-216-077-00	METAL GLAZE	15K	5%	1/10W	
R213	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R214	1-216-085-00	METAL GLAZE	33K	5%	1/10W	
R215	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R216	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R217	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R218	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R219	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R220	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R221	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R222	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R223	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R224	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R225	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R226	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R227	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R228	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R301	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R302	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R303	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R304	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R305	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R306	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R307	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R308	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R309	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R310	1-216-045-00	METAL GLAZE	680	5%	1/10W	
R311	1-216-039-00	METAL GLAZE	390	5%	1/10W	
R312	1-216-077-00	METAL GLAZE	15K	5%	1/10W	
R313	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R314	1-216-085-00	METAL GLAZE	33K	5%	1/10W	
R315	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R316	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R317	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R318	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R319	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R320	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R321	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R322	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R323	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R324	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R325	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R326	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R327	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R328	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R401	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R402	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R403	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R404	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R405	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R406	1-216-009-00	METAL GLAZE	22	5%	1/10W	
R407	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R408	1-216-081-00	METAL GLAZE	22K	5%	1/10W	
R409	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R410	1-216-045-00	METAL GLAZE	680	5%	1/10W	
R411	1-216-039-00	METAL GLAZE	390	5%	1/10W	
R413	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R414	1-216-085-00	METAL GLAZE	33K	5%	1/10W	
R415	1-216-049-00	METAL GLAZE	1K	5%	1/10W	
R416	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R417	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R417	1-216-077-00	METAL GLAZE	15K	5%	1/10W	
R418	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R419	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R420	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R421	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R422	1-216-023-00	METAL GLAZE	82	5%	1/10W	
R423	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R424	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R425	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R426	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R427	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W	
R428	1-216-025-00	METAL GLAZE	100	5%	1/10W	
R501	1-216-631-11	METAL CHIP	150	0.50%	1/10W	
R502	1-216-631-11	METAL CHIP	150	0.50%	1/10W	

When indicating parts by reference number, please include the board name.

IF-19 **PTC-4** **PTC-26**

Ref.No	Part No.	Description	Remark
R503	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R504	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R505	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R506	1-216-009-00	METAL GLAZE 22 5% 1/10W	
R507	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R508	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R509	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R510	1-216-045-00	METAL GLAZE 680 5% 1/10W	
R511	1-216-039-00	METAL GLAZE 390 5% 1/10W	
R512	1-216-077-00	METAL GLAZE 15K 5% 1/10W	
R513	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R514	1-216-085-00	METAL GLAZE 33K 5% 1/10W	
R515	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R516	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R517	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R518	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R519	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R520	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R521	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R522	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R523	1-216-631-11	METAL CHIP 150 0.50% 1/10W	
R524	1-216-631-11	METAL CHIP 150 0.50% 1/10W	
R525	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R526	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R527	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R528	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R601	1-216-631-11	METAL CHIP 150 0.50% 1/10W	
R602	1-216-631-11	METAL CHIP 150 0.50% 1/10W	
R603	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R604	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R605	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R606	1-216-009-00	METAL GLAZE 22 5% 1/10W	
R607	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R608	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R609	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R610	1-216-045-00	METAL GLAZE 680 5% 1/10W	
R611	1-216-039-00	METAL GLAZE 390 5% 1/10W	
R612	1-216-077-00	METAL GLAZE 15K 5% 1/10W	
R613	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R614	1-216-085-00	METAL GLAZE 33K 5% 1/10W	
R615	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R616	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R617	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R618	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R619	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R620	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R621	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R622	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R623	1-216-631-11	METAL CHIP 150 0.50% 1/10W	
R624	1-216-631-11	METAL CHIP 150 0.50% 1/10W	
R625	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R626	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R627	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R628	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R701	1-216-631-11	METAL CHIP 150 0.50% 1/10W	
R702	1-216-631-11	METAL CHIP 150 0.50% 1/10W	
R703	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R704	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R705	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R706	1-216-025-00	METAL GLAZE 100 5% 1/10W	

Ref.No	Part No.	Description	Remark
R707	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R708	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R709	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R710	1-216-045-00	METAL GLAZE 680 5% 1/10W	
R711	1-216-039-00	METAL GLAZE 390 5% 1/10W	
R712	1-216-077-00	METAL GLAZE 15K 5% 1/10W	
R713	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R714	1-216-085-00	METAL GLAZE 33K 5% 1/10W	
R715	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R716	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R717	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R718	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R719	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R720	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R721	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R722	1-216-023-00	METAL GLAZE 82 5% 1/10W	
R723	1-216-631-11	METAL CHIP 150 0.50% 1/10W	
R724	1-216-631-11	METAL CHIP 150 0.50% 1/10W	
R725	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R726	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R727	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
R728	1-216-025-00	METAL GLAZE 100 5% 1/10W	
R801	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R802	1-216-073-00	METAL GLAZE 10K 5% 1/10W	

<VARIABLE RESISTOR>

Ref.No	Part No.	Description	Remark
RV101	1-238-783-11	RES, ADJ, CERMET 500	
RV201	1-238-783-11	RES, ADJ, CERMET 500	
RV301	1-238-783-11	RES, ADJ, CERMET 500	
RV401	1-238-783-11	RES, ADJ, CERMET 500	
RV501	1-238-783-11	RES, ADJ, CERMET 500	
RV601	1-238-783-11	RES, ADJ, CERMET 500	
RV701	1-238-783-11	RES, ADJ, CERMET 500	

<SWITCH>

Ref.No	Part No.	Description	Remark
S301	1-553-638-00	SWITCH, SLIDE	
S401	1-553-638-00	SWITCH, SLIDE	
S801	1-553-638-00	SWITCH, SLIDE	

****

*A-8276-129-A MOUNTED PCB, PTC-4
****

<PHOTO TRANSISTOR>

Ref.No	Part No.	Description	Remark
PH1001	8-729-015-05	TRANSISTOR, PHOTO, TPS612-B	

<HARNESS>

Ref.No	Part No.	Description	Remark
W1002	*1-949-370-11	HARNESS (SENSOR(PEP))	

****

*A-8276-130-A MOUNTED PCB, PTC-26
****

<PHOTO TRANSISTOR>

Ref.No	Part No.	Description	Remark
PH1003	8-729-015-05	TRANSISTOR, PHOTO, TPS612-B	

<HARNESS>

Ref.No	Part No.	Description	Remark
W1006	*1-949-373-11	HARNESS (SENSOR(JP))	

When indicating parts by reference number, please include the board name.

PTC-25 **PTC-24** **PTC-23** **SW-32** **SW-36** **SW-37** **S-8** **PTC-3** **SU-5** **SW-31**

****

*A-8276-131-A MOUNTED PCB. PTC-25
****

Ref.No	Part No.	Description	Remark
		<DIODE>	
D1003	8-719-024-91	DIODE. PHOTO. SIR-481ST3F	
		<HARNESS>	
W1005	*1-949-372-11	HARNESS (SENSOR(JL))	

****

*A-8276-132-A MOUNTED PCB. PTC-24
****

Ref.No	Part No.	Description	Remark
		<PHOTO TRANSISTOR>	
PH1002	8-729-015-05	TRANSISTOR. PHOTO. TPS612-B	

****

*A-8276-133-A MOUNTED PCB. PTC-23
****

Ref.No	Part No.	Description	Remark
		<DIODE>	
D1002	8-719-024-91	DIODE. PHOTO. SIR-481ST3F	
		<HARNESS>	
W1003	*1-949-371-11	HARNESS (SENSOR(RCL))	

****

*A-8276-134-A MOUNTED PCB. SW-32
****

Ref.No	Part No.	Description	Remark
		<SWITCH>	
S1002	1-572-616-11	SWITCH. PUSH (1 KEY)	
S1003	1-572-616-11	SWITCH. PUSH (1 KEY)	
S1004	1-572-616-11	SWITCH. PUSH (1 KEY)	
S1005	1-572-616-11	SWITCH. PUSH (1 KEY)	
		<HARNESS>	
W1013	*1-949-376-11	HARNESS (SENSOR(RMS))	

****

*A-8276-135-A MOUNTED PCB. SW-36
****

Ref.No	Part No.	Description	Remark
		<PHOTO DIODE>	
PH1007	8-749-920-95	DIOTE. PHOTO. GP2S22	
		<HARNESS>	
W1014	*1-949-379-11	HARNESS (SENSOR(PC1))	
	3-701-439-41	WASHER	

****

*A-8276-136-A MOUNTED PCB. SW-37
****

Ref.No	Part No.	Description	Remark
		<PHOTO DIODE>	
PH1008	8-749-920-95	DIOTE. PHOTO. GP2S22	
	3-701-439-41	WASHER	

****

*A-8276-137-A MOUNTED PCB. S-8
****

Ref.No	Part No.	Description	Remark
		<SWITCH>	
S1001	1-572-988-11	SWITCH. SS6GL13D	
		<HARNESS>	
W1008	*1-949-377-11	HARNESS (SENSOR(TS))	

****

*A-8276-138-A MOUNTED PCB. PTC-3
****

Ref.No	Part No.	Description	Remark
		<DIODE>	
D1001	8-719-024-91	DIODE. PHOTO. SIR-481ST3F	
		<HARNESS>	
W1001	*1-949-369-11	HARNESS (SENSOR(PEL))	

****

*1-641-670-11 SU-5 BOARD
****

Ref.No	Part No.	Description	Remark
		<HARNESS>	
W1011	*1-949-368-11	HARNESS B(HM)	

****

*A-8276-140-A MOUNTED PCB. SW-31
****

Ref.No	Part No.	Description	Remark
		<PHOTO DIODE>	
PH1005	8-719-800-95	DIODE TLP805	
		<HARNESS>	
W1007	*1-949-375-11	HARNESS (SENSOR(HP))	

****

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
	*1-641-669-11	SU-4 BOARD	
	*************************		
		<HARNESS>	
W1010	*1-949-367-11	HARNESS A(RM)	
**			
	*A-8276-142-A	MOUNTED PCB, SW-30	
	**********************************		
		<PHOTO DIODE>	
PH1004	8-749-920-95	DIODE, PHOTO, GP2S22	
		<HARNESS>	
W1012	*1-949-374-11	HARNESS (SENSOR(RRT))	
	3-701-439-41	WASHER	
**			
	*A-8276-143-A	MOUNTED PCB, SW-35	
	**********************************		
		<PHOTO DIODE>	
PH1006	8-719-800-95	DIODE TLP805	
		<HARNESS>	
W1009	*1-949-378-11	HARNESS (SENSOR(HHP))	
**			
	*A-8276-144-A	MOUNTED PCB, DSC-8	
	**********************************		
		<CONNECTOR>	
CN1101	*1-568-946-11	PIN, CONNECTOR 8P	
		<VARIABLE RESISTOR>	
RV1101	1-241-737-11	RES, VAR, CARBON 10K/10K/10K GAIN/HUE/COLOR	
		<SWITCH>	
S1101	1-570-857-11	SWITCH, SLIDE VAR←→AGC	
**			
	*A-8276-145-A	IF-21 BOARD, COMPLETE	
	**********************************		
	1-236-163-11	ENCAPSULATED COMPONENT	
		<CONNECTOR>	
CN901	*1-568-948-11	PIN, CONNECTOR 10P	
CN902	*1-563-142-11	CONNECTOR, D-SUB(MOUNT TYPE)25P	
		<JACK>	
J901	1-507-967-11	JACK	

Ref.No	Part No.	Description	Remark
**			
	*A-8276-146-A	MOUNTED PCB, DSC-9	
	*********************************		
		<CAPACITOR>	
C1	1-124-234-00	ELECT 22MF 20% 16V	
		<CONNECTOR>	
CN1201	*1-568-943-11	PIN, CONNECTOR 5P	
CN1202	*1-564-027-00	PIN, CONNECTOR 2P	
CN1203	*1-564-028-00	PIN, CONNECTOR 3P	
CN1204	*1-568-941-11	PIN, CONNECTOR 3P	
		<TRANSISTOR>	
Q1	8-729-100-66	TRANSISTOR 2SC1623	
Q2	8-729-205-95	TRANSISTOR 2SB822-Q	
		<RESISTOR>	
R1	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R2	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R3	1-216-055-00	METAL GLAZE 1.8K 5% 1/10W	
R4	1-216-053-00	METAL GLAZE 1.5K 5% 1/10W	
		<VARIABLE RESISTOR>	
RV1201	1-241-737-11	RES, VAR, CARBON 10K/10K/10K RED/GREEN/BLUE	
**			
	*A-8276-147-A	KY-12 BOARD, COMPLETE	
	************************************		
	1-808-894-11	DISPLAY PANEL, LIQUID CRYSTAL	
	7-685-104-19	SCREW +P 2X6 TYPE2 SLIT	
		<CAPACITOR>	
C1	1-163-275-11	CERAMIC CHIP 0.001MF 5% 50V	
C2	1-163-275-11	CERAMIC CHIP 0.001MF 5% 50V	
C4	1-163-275-11	CERAMIC CHIP 0.001MF 5% 50V	
C5	1-163-275-11	CERAMIC CHIP 0.001MF 5% 50V	
C7	1-163-275-11	CERAMIC CHIP 0.001MF 5% 50V	
C8	1-163-275-11	CERAMIC CHIP 0.001MF 5% 50V	
C10	1-163-275-11	CERAMIC CHIP 0.001MF 5% 50V	
C11	1-163-275-11	CERAMIC CHIP 0.001MF 5% 50V	
C15	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C18	1-163-275-11	CERAMIC CHIP 0.001MF 5% 50V	
C20	1-163-275-11	CERAMIC CHIP 0.001MF 5% 50V	
C22	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C24	1-124-589-11	ELECT 47MF 20% 10V	
C26	1-163-235-11	CERAMIC CHIP 22PF 5% 50V	
C28	1-124-589-11	ELECT 47MF 20% 10V	
C30	1-163-235-11	CERAMIC CHIP 22PF 5% 50V	
C31	1-124-584-00	ELECT 100MF 20% 10V	
C32	1-163-275-11	CERAMIC CHIP 0.001MF 5% 50V	
C33	1-163-275-11	CERAMIC CHIP 0.001MF 5% 50V	
C34	1-163-275-11	CERAMIC CHIP 0.001MF 5% 50V	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
C35	1-163-275-11	CERAMIC CHIP 0.001MF 5%	50V
C36	1-163-275-11	CERAMIC CHIP 0.001MF 5%	50V
C37	1-163-275-11	CERAMIC CHIP 0.001MF 5%	50V
C38	1-163-275-11	CERAMIC CHIP 0.001MF 5%	50V
C39	1-163-275-11	CERAMIC CHIP 0.001MF 5%	50V
C40	1-163-275-11	CERAMIC CHIP 0.001MF 5%	50V
C41	1-163-275-11	CERAMIC CHIP 0.001MF 5%	50V
C42	1-163-275-11	CERAMIC CHIP 0.001MF 5%	50V
C43	1-163-275-11	CERAMIC CHIP 0.001MF 5%	50V
C44	1-163-275-11	CERAMIC CHIP 0.001MF 5%	50V
C45	1-163-275-11	CERAMIC CHIP 0.001MF 5%	50V
		<CONNECTOR>	
CN3	1-568-954-11	PIN. CONNECTOR 5P	
CN4	1-568-955-11	PIN. CONNECTOR 6P	
CN5	*1-568-941-11	PIN. CONNECTOR 3P	
		<DIODE>	
D1	8-719-104-34	DIODE 1S2836	
D2	8-719-104-34	DIODE 1S2836	
D3	8-719-200-02	DIODE 10E-2	
D4	8-719-940-89	DIODE SLP655B-50	
D5	8-719-975-79	DIODE SLP-255B-51-A	
		<IC>	
IC1	8-759-988-13	IC LM393PS	
IC2	8-759-059-62	IC HD6433258F-A10F	
IC3	8-759-970-26	IC PST523C	
IC4	8-749-900-69	IC BX-1457	
		<INDUCTOR>	
L1	1-408-978-21	INDUCTOR 47UH	
		<TRANSISTOR>	
Q1	8-729-100-66	TRANSISTOR 2SC1623	
Q2	8-729-100-66	TRANSISTOR 2SC1623	
		<RESISTOR>	
R15	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R16	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R17	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R18	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R19	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R20	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R21	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R22	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R23	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R24	1-216-089-00	METAL GLAZE 47K 5%	1/10W
R25	1-216-073-00	METAL GLAZE 10K 5%	1/10W
R26	1-216-073-00	METAL GLAZE 10K 5%	1/10W
R27	1-216-085-00	METAL GLAZE 33K 5%	1/10W
R28	1-216-077-00	METAL GLAZE 15K 5%	1/10W
R29	1-216-073-00	METAL GLAZE 10K 5%	1/10W
R30	1-216-043-00	METAL GLAZE 560 5%	1/10W
R31	1-216-017-00	METAL GLAZE 47 5%	1/10W
R32	1-216-073-00	METAL GLAZE 10K 5%	1/10W
R33	1-216-025-00	METAL GLAZE 100 5%	1/10W
R34	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R35	1-216-089-00	METAL GLAZE 47K 5%	1/10W
R36	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R37	1-216-089-00	METAL GLAZE 47K 5%	1/10W
R38	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R39	1-216-089-00	METAL GLAZE 47K 5%	1/10W
R40	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R41	1-216-089-00	METAL GLAZE 47K 5%	1/10W
R42	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R43	1-216-089-00	METAL GLAZE 47K 5%	1/10W
R44	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R45	1-216-089-00	METAL GLAZE 47K 5%	1/10W
R46	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R47	1-216-089-00	METAL GLAZE 47K 5%	1/10W
R48	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R49	1-216-089-00	METAL GLAZE 47K 5%	1/10W
R50	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R51	1-216-089-00	METAL GLAZE 47K 5%	1/10W
R52	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R53	1-216-089-00	METAL GLAZE 47K 5%	1/10W
R54	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R55	1-216-089-00	METAL GLAZE 47K 5%	1/10W
R56	1-216-059-00	METAL GLAZE 2.7K 5%	1/10W
R57	1-216-029-00	METAL GLAZE 150 5%	1/10W
R58	1-216-059-00	METAL GLAZE 2.7K 5%	1/10W
R59	1-216-029-00	METAL GLAZE 150 5%	1/10W
R60	1-216-109-00	METAL GLAZE 330K 5%	1/10W
R61	1-216-051-00	METAL GLAZE 1.2K 5%	1/10W
R62	1-216-051-00	METAL GLAZE 1.2K 5%	1/10W
R63	1-216-051-00	METAL GLAZE 1.2K 5%	1/10W
R64	1-216-042-00	METAL GLAZE 510 5%	1/10W
R65	1-216-049-00	METAL GLAZE 1K 5%	1/10W
R66	1-216-001-00	METAL GLAZE 10 5%	1/10W
R67	1-216-042-00	METAL GLAZE 510 5%	1/10W
R68	1-216-042-00	METAL GLAZE 510 5%	1/10W
R69	1-216-001-00	METAL GLAZE 10 5%	1/10W
R70	1-216-001-00	METAL GLAZE 10 5%	1/10W
R71	1-216-042-00	METAL GLAZE 510 5%	1/10W
R72	1-216-051-00	METAL GLAZE 1.2K 5%	1/10W
		<SWITCH>	
S1	1-554-303-21	SWITCH. KEY BOARD	
S2	1-554-303-21	SWITCH. KEY BOARD	
S3	1-554-303-21	SWITCH. KEY BOARD	
S4	1-554-303-21	SWITCH. KEY BOARD	
S5	1-554-303-21	SWITCH. KEY BOARD	
S6	1-554-303-21	SWITCH. KEY BOARD	
S7	1-554-303-21	SWITCH. KEY BOARD	
S8	1-554-303-21	SWITCH. KEY BOARD	
S9	1-554-303-21	SWITCH. KEY BOARD	
S10	1-554-303-21	SWITCH. KEY BOARD	
S11	1-554-303-21	SWITCH. KEY BOARD	
		<CRYSTAL>	
X1	1-577-110-11	VIBRATOR. CRYSTAL 20MHz	

****

When indicating parts by reference number, please include the board name.

VTR-P3A

Ref.No	Part No.	Description		Remark
	⚠ *1-413-688-11	POWER SUPPLY (VTR-P3A) BOARD		
	**			
	9-901-930-01	PRINTED CIRCUIT BOARD P-906082A		
	9-902-093-01	PRINTED CIRCUIT BOARD P-906082B		
	9-994-165-01	PIN, CHECK		
	⚠ 9-995-335-01	CLIP, FUSE (FOR F2)		
	9-901-947-01	COVER, FUSE (FOR F61)		
		<CAPACITOR>		
C1	⚠ 9-901-953-01	CERAMIC	220P	125V
C11	9-901-958-01	ELECT	1200	200V
C13	1-136-165-00	FILM	0.1	50V
C16	1-129-751-00	FILM	0.1	400V
C17-1	9-901-959-01	CERAMIC	1500P	2KV
C17-2	9-901-959-01	CERAMIC	1500P	2KV
C2	⚠ 9-901-953-01	CERAMIC	220P	125V
C21	1-124-918-11	ELECT	47	35V
C22	1-136-165-00	FILM	0.1	50V
C23	1-136-165-00	FILM	0.1	50V
C24	1-126-101-11	ELECT	100	10V
C25	1-136-157-00	FILM	0.022	50V
C26	1-136-165-00	FILM	0.1	50V
C27	9-901-960-01	ELECT	27	35V
C28-1	⚠ 9-901-966-01	CERAMIC	220P	125V
C4-1	⚠ 9-901-953-01	CERAMIC	220P	125V
C41	1-124-557-11	ELECT	1000	25V
C42	1-124-557-11	ELECT	1000	25V
C43	1-124-557-11	ELECT	1000	25V
C45	1-136-165-00	FILM	0.1	50V
C46	1-136-165-00	FILM	0.1	50V
C47	1-136-165-00	FILM	0.1	50V
C48	1-124-360-00	ELECT	1000	16V
C49	1-124-360-00	ELECT	1000	16V
C5	⚠ 9-901-955-01	FILM	0.22	125V
C50	1-124-360-00	ELECT	1000	16V
C51	9-901-961-01	CERAMIC	1000P	1KV
C52	9-901-961-01	CERAMIC	1000P	1KV
C54	9-901-962-01	ELECT	2700	35V
C56	9-901-962-01	ELECT	2700	35V
C57	9-901-962-01	ELECT	2700	35V
C58	1-124-912-11	ELECT	330	50V
C59	1-124-912-11	ELECT	330	50V
C61	9-901-963-01	CERAMIC	1000P	1KV
C62	9-901-964-01	ELECT	1200	35V
C63	1-136-165-00	FILM	0.1	50V
C64	1-130-994-11	FILM	0.033	50V
C65	1-130-072-00	FILM	0.022	50V
C66	1-130-072-00	FILM	0.022	50V
C67	9-901-965-01	ELECT	2700	10V
C68	9-901-968-01	ELECT	10000	6.3V
C69	1-136-153-00	FILM	0.01	50V
C7	⚠ 9-901-956-01	FILM	0.47	125V
C70	1-136-165-00	FILM	0.1	50V
C8	⚠ 9-901-955-01	FILM	0.22	125V
C81	1-124-903-11	ELECT	1	50V
C82	1-124-918-11	ELECT	47	35V
C83	1-136-499-11	FILM	0.047	50V
C84	1-130-014-00	FILM	470P	50V
C85	1-124-482-11	ELECT	33	35V
C86	9-901-967-01	CERAMIC	270P	1KV
C89	1-136-499-11	FILM	0.047	50V
C91	1-136-165-00	FILM	0.1	50V
C92	1-136-165-00	FILM	0.1	50V
C93	1-136-165-00	FILM	0.1	50V
C94	9-901-967-01	CERAMIC	270P	1KV
		<CONNECTOR>		
CN1	*1-506-473-11	CONNECTOR 8P		
CN10	⚠ *1-564-419-11	CONNECTOR SPRING HEADER 2P		
CN12	*1-506-475-11	CONNECTOR 10P		
CN2	*1-506-479-11	CONNECTOR 14P		
CN4	*1-506-474-11	CONNECTOR 9P		
CN5	*1-562-716-11	CONNECTOR 10P		
CN6	*9-901-929-01	CONNECTOR		
CN7	⚠ *1-564-419-11	CONNECTOR SPRING HEADER 2P		
CN9	⚠ *1-564-419-11	CONNECTOR SPRING HEADER 2P		
		<DIODE>		
D11	8-719-510-26	DIODE D1NL20		
D16	9-901-937-01	DIODE DFG2A8		
D21	8-719-510-17	DIODE S2LA20		
D41	8-719-500-66	DIODE S3LA20		
D42	8-719-500-66	DIODE S3LA20		
D61	8-719-500-70	DIODE D5S4M		
D62	8-719-503-40	DIODE S3V40		
D63	8-719-975-85	DIODE ERB82-004		
D81	9-984-364-01	DIODE 1S2075K		
D82	9-984-364-01	DIODE 1S2075K		
D83	9-984-364-01	DIODE 1S2075K		
D84	8-719-913-44	DIODE ERA82-004		
PC21	⚠ 9-901-940-01	PHOTO COUPLER PC111LS		
PC22	⚠ 9-901-940-01	PHOTO COUPLER PC111LS		
POS51	9-901-946-01	POSITIVE THERMISTOR		
RF11	8-719-500-16	DIODE D5SB60		
RF41	9-992-099-01	DIODE D5LCA20		
RF51	8-719-981-44	DIODE ESAC92M-02		
RF52	8-719-500-41	DIODE D8LCA20		
RF61	8-719-989-43	DIODE ESAD82M-004		
RT61	9-901-952-01	THERMISTER 10KD-5		
TH11	9-901-938-01	TRIAC AC10DGM		
TH61	9-901-939-01	THYRISTOR 5P4M		
ZD61	8-719-109-89	DIODE RD5.6ESB2		
ZD81	8-719-109-85	DIODE RD5.1ESB2		
ZD82	8-719-930-61	DIODE HZ30-1		
		<FUSE>		
F2	⚠ 9-901-941-01	FUSE	6A 125V	
F61	⚠ 9-901-945-01	FUSE	3.15A 125V	
		<IC>		
H21	9-901-943-01	IC RHA18-1		
H61	9-901-944-01	IC RHA11-1		

When indicating parts by reference number, please include the board name.

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

Ref.No	Part No.	Description			Remark
M41	9-901-942-01	IC PQ12RF11			
M42	9-901-942-01	IC PQ12RF11			
M43	8-759-518-68	IC PQ12RF21			
M81	9-992-107-01	IC AN14317			
M82	1-807-117-11	IC TA75358P			
		<INDUCTOR>			
L1	⚠ 9-901-931-01	CHOKE COIL	5.6mH	2.5A	
L4	⚠ 9-901-931-01	CHOKE COIL	5.6mH	2.5A	
L61	9-901-932-01	CHOKE COIL	1uH	8A	
L62	9-901-933-01	CHOKE COIL	90uH	5A	
		<TRANSISTOR>			
Q11	9-901-935-01	TRANSISTOR 2SK1018			
Q51	8-729-173-36	TRANSISTOR 2SA733			
Q61	9-901-936-01	TRANSISTOR 2SC2750			
Q62	8-729-202-44	TRANSISTOR 2SA1020			
Q63	8-729-173-36	TRANSISTOR 2SA733			
		<RESISTOR>			
R1	⚠ 9-994-152-01	METAL GLAZE	220K	1W	
R11	⚠ 9-995-339-01	FUSE	12 135℃	5W	
R12	⚠ 1-215-908-00	METAL GLAZE	33	3W	
R13	1-249-414-11	CARBON	560	1/4W	
R15	⚠ 1-215-858-00	METAL GLAZE	15	1W	
R16-1	⚠ 9-994-154-01	CEMENT	27K	5W	
R16-2	⚠ 9-994-154-01	CEMENT	27K	5W	
R17	⚠ 1-207-632-00	METAL GLAZE	47	3W	
R18	⚠ 9-901-948-01	METAL PLATE	0.1	5W	
R21-1	⚠ 1-215-902-11	METAL GLAZE	47K	2W	
R22	1-249-435-11	CARBON	33K	1/4W	
R23	9-994-131-01	CARBON	390	1/4W	
R24	9-994-125-01	CARBON	100	1/4W	
R45	1-249-418-11	CARBON	1.2K	1/4W	
R46	1-249-418-11	CARBON	1.2K	1/4W	
R47	1-249-418-11	CARBON	1.2K	1/4W	
R48	1-249-422-11	CARBON	2.7K	1/4W	
R49	1-249-422-11	CARBON	2.7K	1/4W	
R50	1-249-422-11	CARBON	2.7K	1/4W	
R51	1-215-907-11	METAL GLAZE	22	3W	
R52	1-215-907-11	METAL GLAZE	22	3W	
R54	1-216-479-11	METAL GLAZE	560	3W	
R55	9-901-951-01	CEMENT	470	5W	
R61	1-215-907-11	METAL GLAZE	22	3W	
R62	9-994-133-01	CARBON	1K	1/2W	
R63	1-249-402-11	CARBON	56	1/4W	
R64	9-994-125-01	CARBON	100	1/4W	
R65	1-249-434-11	CARBON	27K	1/4W	
R66	9-994-135-01	CARBON	1K	1/4W	
R67	9-994-135-01	CARBON	1K	1/4W	
R68	9-994-135-01	CARBON	1K	1/4W	
R69-1	9-901-949-01	METAL PLATE	0.22	5W	
R69-2	9-901-949-01	METAL PLATE	0.22	5W	
R70	9-994-135-01	CARBON	1K	1/4W	
R72	1-249-410-11	CARBON	270	1/4W	
R73	1-249-408-11	CARBON	180	1/4W	
R74	9-901-950-01	METAL PLATE	0.05	2W	
R75	1-249-393-11	CARBON	10	1/4W	
R76	9-994-135-01	CARBON	1K	1/4W	
R81	1-249-409-11	CARBON	220	1/4W	
R82	9-994-135-01	CARBON	1K	1/4W	
R83	9-994-145-01	CARBON	8.2K	1/4W	
R84	1-249-409-11	CARBON	220	1/4W	
R85	1-247-844-11	CARBON	3.6K	1/4W	
R86	1-249-438-11	CARBON	56K	1/4W	
R87	9-901-954-01	CARBON	2.7K	1/2W	
R88	9-994-137-01	CARBON	1.8K	1/4W	
R89	1-249-418-11	CARBON	1.2K	1/4W	
R90	1-249-434-11	CARBON	27K	1/4W	
R93	9-901-957-01	CARBON	220	1/2W	
R94	1-215-869-11	METAL GLAZE	1K	1W	
R95	9-994-144-01	CARBON	5.6K	1/4W	
R96	9-994-135-01	CARBON	1K	1/4W	
R97	1-249-438-11	CARBON	56K	1/4W	
R98	9-994-138-01	CARBON	2.2K	1/4W	
R99	1-249-414-11	CARBON	560	1/4W	
		<VARIABLE RESISTOR>			
RV21	1-228-991-00	RES. ADJ.	2K		
RV61	1-228-989-00	RES. ADJ.	500		
RV81	1-228-990-00	RES. ADJ.	1K		
RV83	1-228-991-00	RES. ADJ.	2K		
		<TRANSFORMER>			
T11	⚠ 9-901-934-01	TRANSFORMER			

****

MISCELLANEOUS
****

Ref.No	Part No.	Description	Remark
M901	1-541-594-11	MOTOR, STEPPING	
M902	*A-8276-139-A	MOUNTED PCB, SU-5	
M903	*A-8276-141-A	MOUNTED PCB, SU-4	
M904	1-541-593-22	MOTOR, DC FAN	
	*1-543-881-12	HEAD, THERMAL(TH55212)	
	1-507-195-21	SPECIAL REMOTE CONTROL JACK	
	⚠ 1-509-841-00	CONNECTOR, AC OUTLET	
	1-535-316-11	TERMINAL, GROUND (M4)	
	1-541-309-11	MOTOR, L (RF-370C)	
	1-541-593-22	MOTOR, DC FAN	
	⚠ 1-554-880-11	SWITCH, PUSH (AC POWER)(1 KEY)	
	*1-559-969-11	WIRE, FLAT TYPE (16 CORE)	
	1-562-227-21	RECEPTACLE, BNC	
	⚠ 1-580-375-11	INLET 3P	
	*1-690-502-11	WIRE, FLAT TYPE (10 CORE)	
	⚠ *1-940-905-12	HARNESS, AC (OUT)	
	*1-949-365-11	HARNESS (MAIN)	
	*1-949-366-11	HARNESS (SUB)	
	*1-949-369-11	HARNESS (SENSOR(PEL))	
	*1-949-370-11	HARNESS (SENSOR(PEP))	
	*1-949-371-11	HARNESS (SENSOR(RCL))	
	*1-949-372-11	HARNESS (SENSOR(JL))	
	*1-949-373-11	HARNESS (SENSOR(JP))	
	*1-949-374-11	HARNESS (SENSOR(RRT))	
	*1-949-375-11	HARNESS (SENSOR(HP))	
	*1-949-376-11	HARNESS (SENSOR(RMS))	
	*1-949-377-11	HARNESS (SENSOR(TS))	
	*1-949-378-11	HARNESS (SENSOR(HHP))	
	*1-949-379-11	HARNESS (SENSOR(PC1))	

When indicating parts by reference number, please include the board name.

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Ne les remplacer que par une piece portant le numero specifie.

Ref.No	Part No.	Description	Remark
	*1-949-383-11	HARNESS (EJ)	
	*1-949-384-11	HARNESS (VR)	
	⚠ *1-949-385-11	HARNESS (AC(SW1))	
	⚠ *1-949-386-11	HARNESS (AC(SW2))	
	⚠ *1-949-387-11	HARNESS (AC(IN))	
	⚠ *1-949-388-11	HARNESS (AC(OUT1))	
	⚠ *1-949-389-11	HARNESS (AC(OUT2))	
	*1-949-446-11	HARNESS (PS)	
	*1-949-447-11	HARNESS (SY)	

****

ACCESSORY & PACKING MATERIALS
****

Part No.	Description
1-465-508-21	COMMANDER, REMOTE
1-557-637-11	CABLE, COMMANDER
⚠ 1-534-827-14	CORD, POWER
*3-173-438-01	CUSHION (UPPER)
*3-173-439-01	CUSHION (LOWER)
*3-173-440-01	(5100)..INDIVIDUAL CARTON
*3-173-441-01	(5150)..INDIVIDUAL CARTON
3-701-628-00	BAG, POLYETHYLENE
3-701-630-00	BAG, POLYETHYLENE
3-725-780-01	TRAY
3-754-155-21	MANUAL, INSTRUCTION
3-754-156-11	CARD, QUICK REFERENCE
3-645-289-00	CLIP, WIRE
3-660-815-00	CLIP, CABLE

****

HARDWARE LIST
****

<STOP RING>

Part No.	Description
7-624-102-04	STOP RING 1.5, TYPE -E
7-624-104-04	STOP RING 2.0, TYPE -E
7-624-105-04	STOP RING 2.3, TYPE -E
7-624-106-04	STOP RING 3.0, TYPE -E
7-624-109-04	STOP RING 5.0, TYPE -E
7-624-111-04	STOP RING 7.0, TYPE -E

<SCREW>

Part No.	Description
7-621-773-95	SCREW +B 2.6X6
7-628-253-40	SCREW +PS 2X10
7-682-545-04	SCREW +B 3X4
7-682-547-04	SCREW +BVTT 3X6 (S)
7-682-547-09	SCREW +B 3X6
7-682-548-04	SCREW +BVTT 3X8 (S)
7-682-561-04	SCREW +B 4X8
7-682-562-04	SCREW +BVTT 4X10 (S)
7-682-646-09	SCREW +PS 3X5
7-682-648-09	SCREW +PS 3X8
7-682-661-09	SCREW +PS 4X8
7-682-655-09	SCREW +PSW 3X30
7-682-903-01	SCREW +PWH 3X5
7-682-948-01	SCREW +PSW 3X8
7-682-949-01	SCREW +PSW 3X10
7-685-104-19	SCREW +P2X6 TYPE2 SLIT

Ref.No	Part No.	Description	Remark
		<TAPPING>	
	7-685-534-19	SCREW +BTP 2.6X8 TYPE2 N-S	
	7-685-645-79	SCREW +BVTP 3X6 TYPE2 N-S	
	7-685-646-79	SCREW +BTP 3X8 TYPE2 N-S	
		<WASHER>	
	7-688-006-01	W 6, SMALL	

When indicating parts by reference number, please include the board name.

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Ne les remplacer que par une piece portant le numero specifie.

SECTION 8
PARTS REPLACEMENT

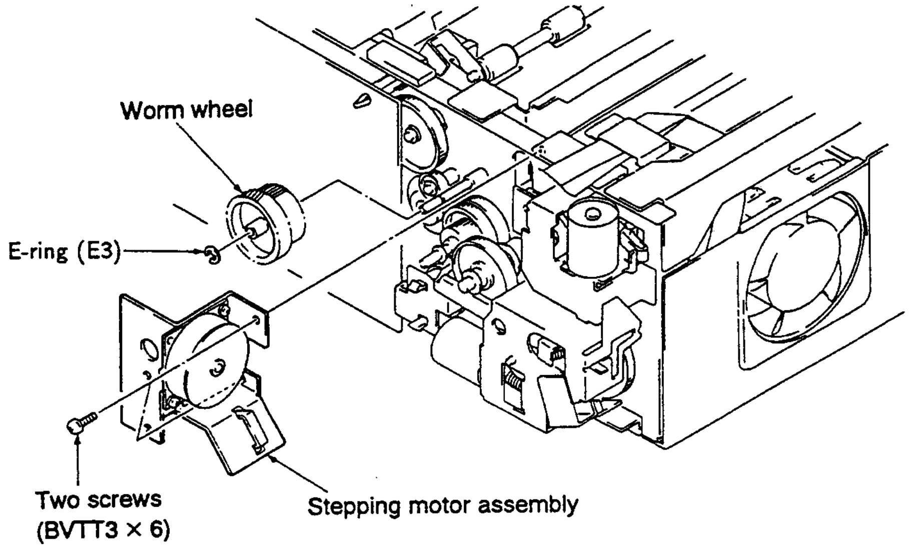
8-1. PREPARATIONS FOR SERVICING AND REPLACEMENT

The mechanism section assembly is removed from the main unit for servicing and replacement of the mechanism section.

8-2. MAINTENANCE, SERVICING, AND REPLACEMENT PROCEDURES

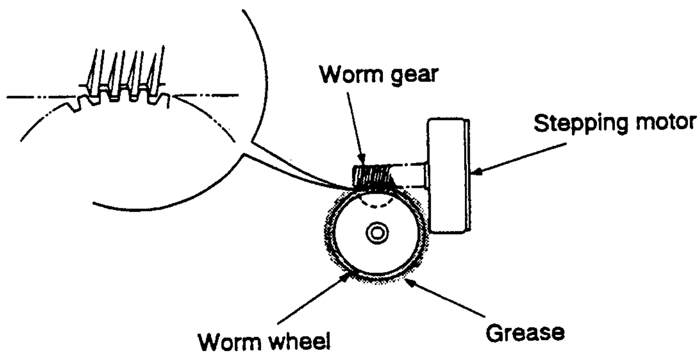
8-2-1. Replacement of Worm Wheel

1) Remove the two screws and remove the stepping motor assembly.
2) Remove the E-ring and pull off the worm wheel from the shaft.


Worm wheel
E-ring (E3)
Two screws
(BVTT3 × 6)
Stepping motor assembly

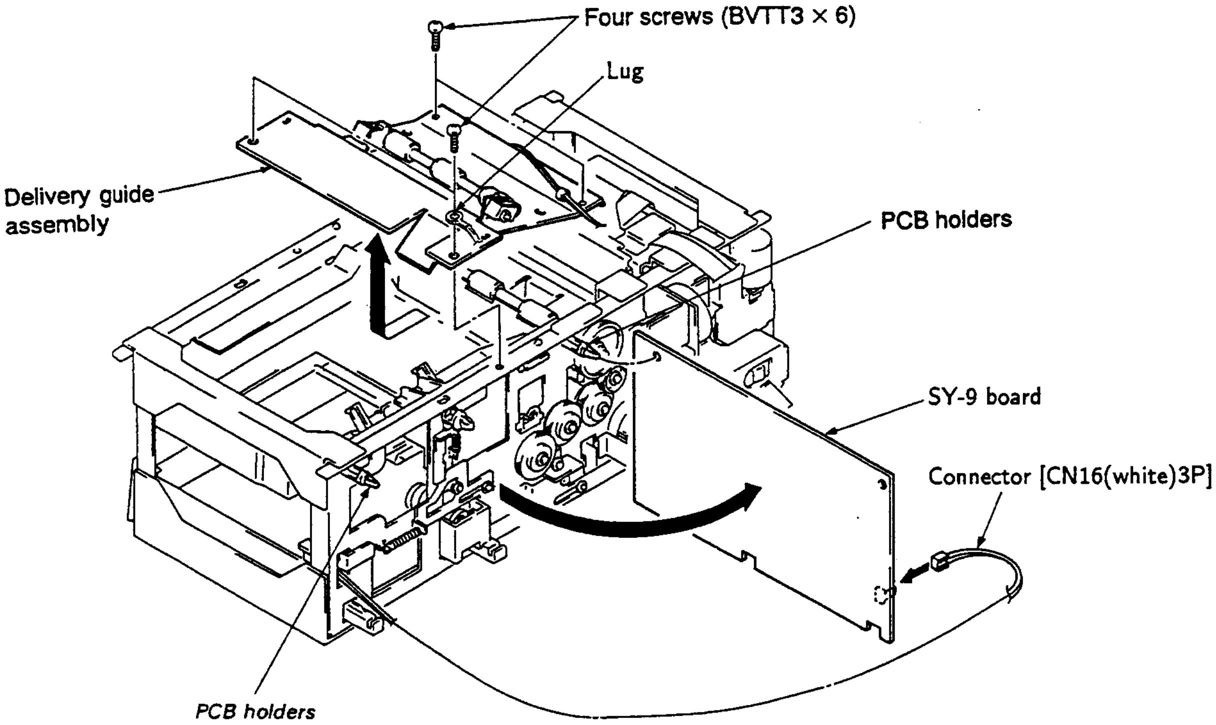
3) Apply a light coat of sony grease around the replacement worm wheel and attach.

Note: Confirm that there is some play between the worm wheel and worm gear.
Sony grease (SGL-701) 7-662-010-08

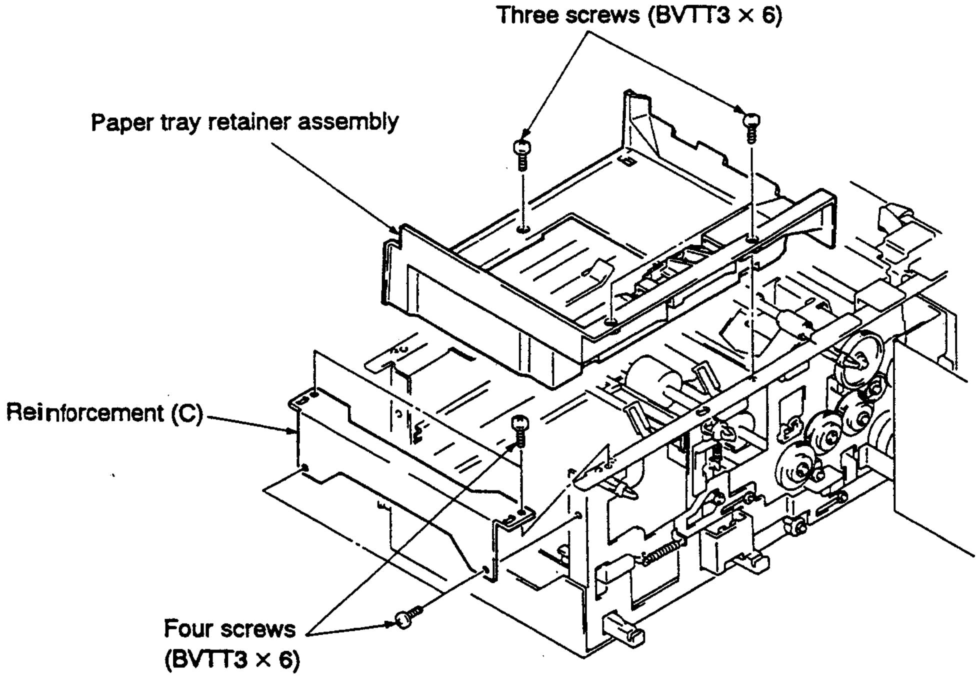

Worm gear
Stepping motor
Worm wheel
Grease

8-2-2. Replacement and Maintenance of Feed Roller

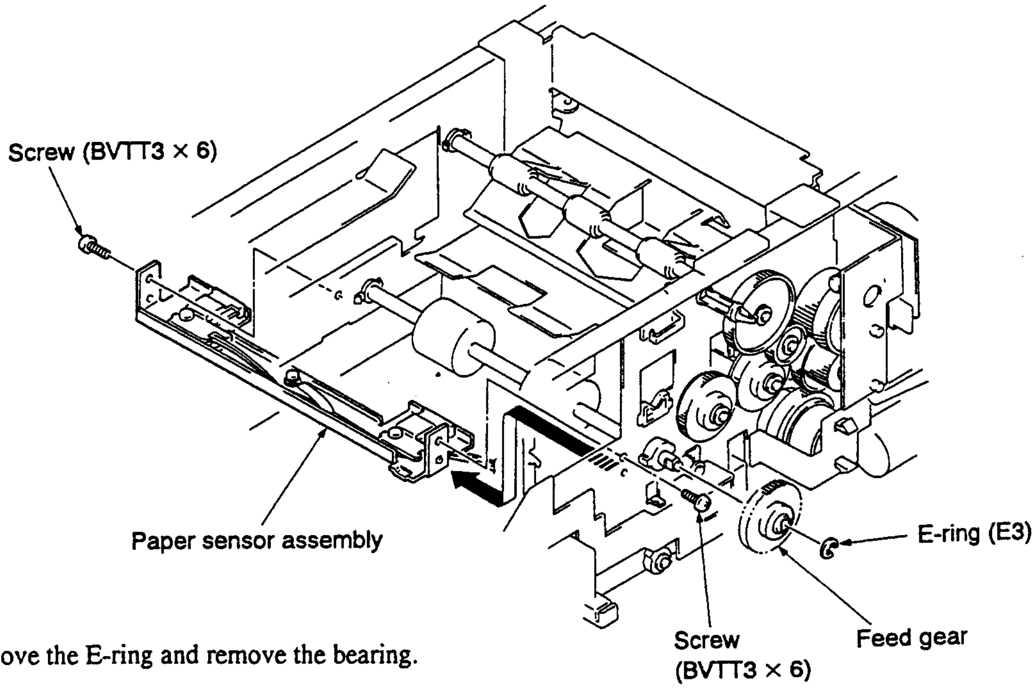
1) Remove the four screws and remove the mechanical shield plate.
2) Remove the four screws, lug and remove the delivery guide assembly.
3) Remove the connector [CN16(white)3P] on the SY-9 board.
4) Push the two claws of the PCB holders and open the SY-9 board.


Four screws (BVTT3 × 6)
Lug
Delivery guide assembly
PCB holders
SY-9 board
Connector [CN16(white)3P]
PCB holders

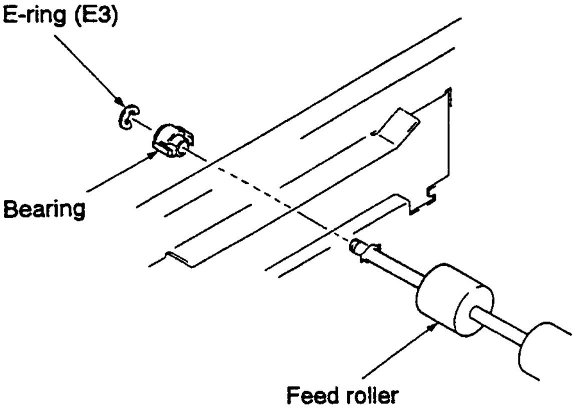
5) Remove the four screws and remove reinforcement (C).
6) Remove the three screws and remove the paper tray retainer assembly.


Three screws (BVTT3 × 6)
Paper tray retainer assembly
Reinforcement (C)
Four screws (BVTT3 × 6)

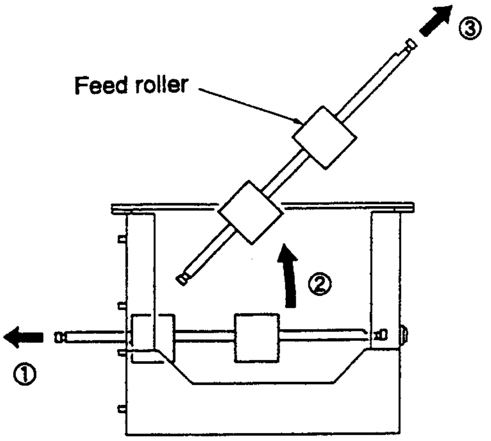
7) Remove the E-ring and pull off the feed gear from the shaft.
8) Remove the two screws and remove the paper sensor assembly.


Screw (BVTT3 × 6)
Paper sensor assembly
E-ring (E3)
Screw
(BVTT3 × 6)
Feed gear

9) Remove the E-ring and remove the bearing.

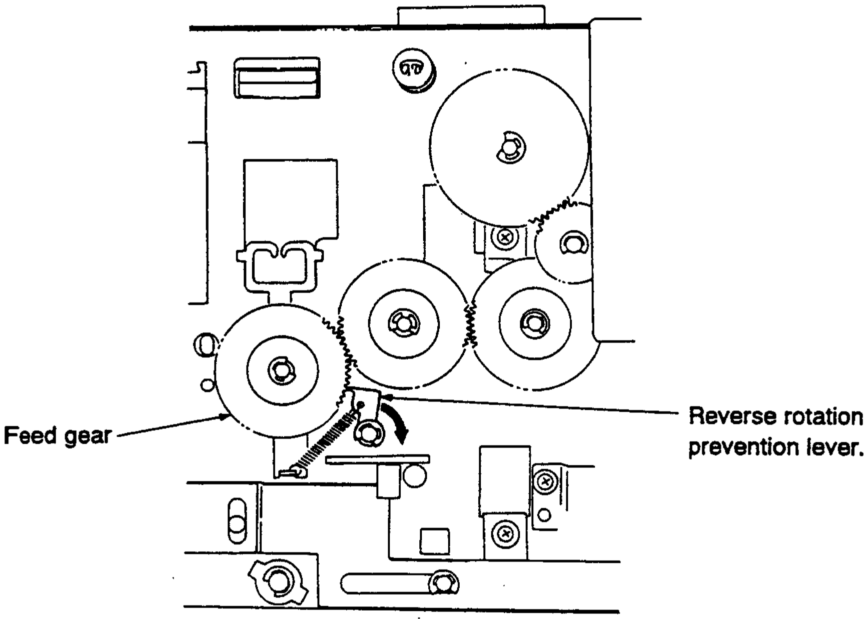

E-ring (E3)
Bearing
Feed roller

10) Remove the feed roller from the main unit by removing one end and then the other.


Feed roller
③
②
①

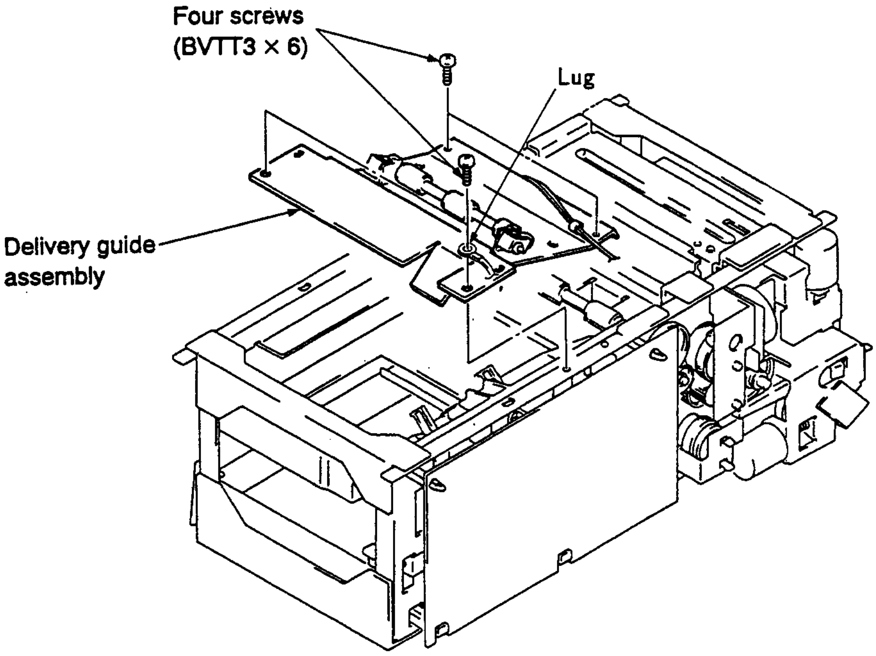
11) Replace the feed roller if worn and apply Sony grease to both ends of the shaft.

Note: When attaching the feed gear, engage the gear with the teeth of the reverse rotation prevention lever while pulling this lever in the clockwise direction.

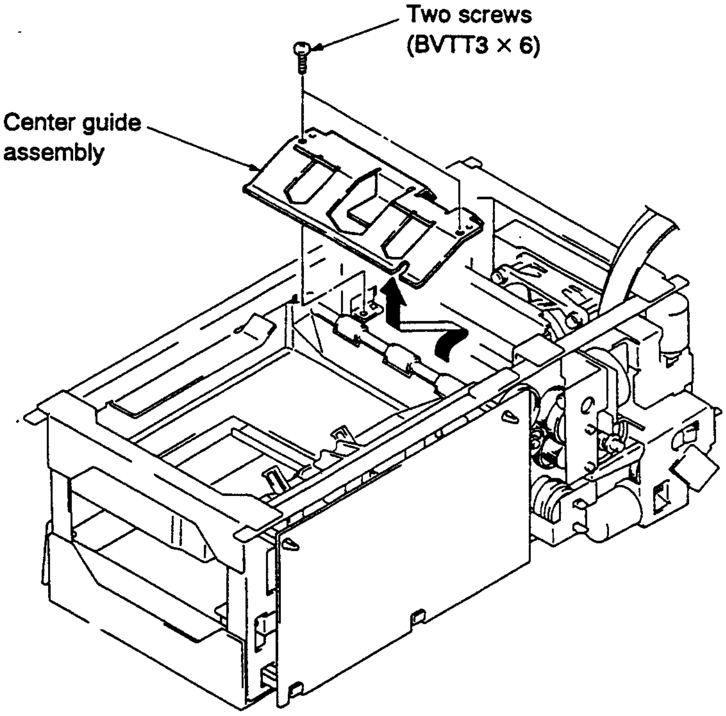

Feed gear
Reverse rotation prevention lever.

8-2-3. Replacement and Meintenance of Platen

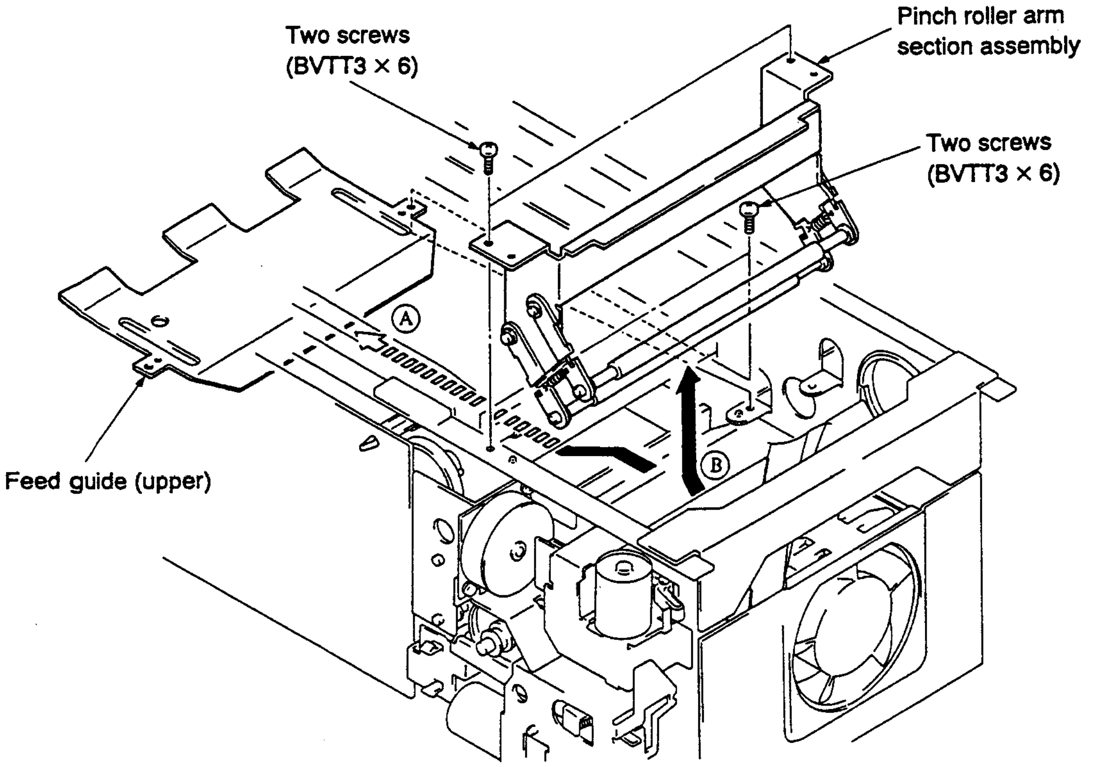
1) Remove the four screws, lug and remove the delivery guide assembly.


Four screws
(BVTT3 × 6)
Lug
Delivery guide
assembly

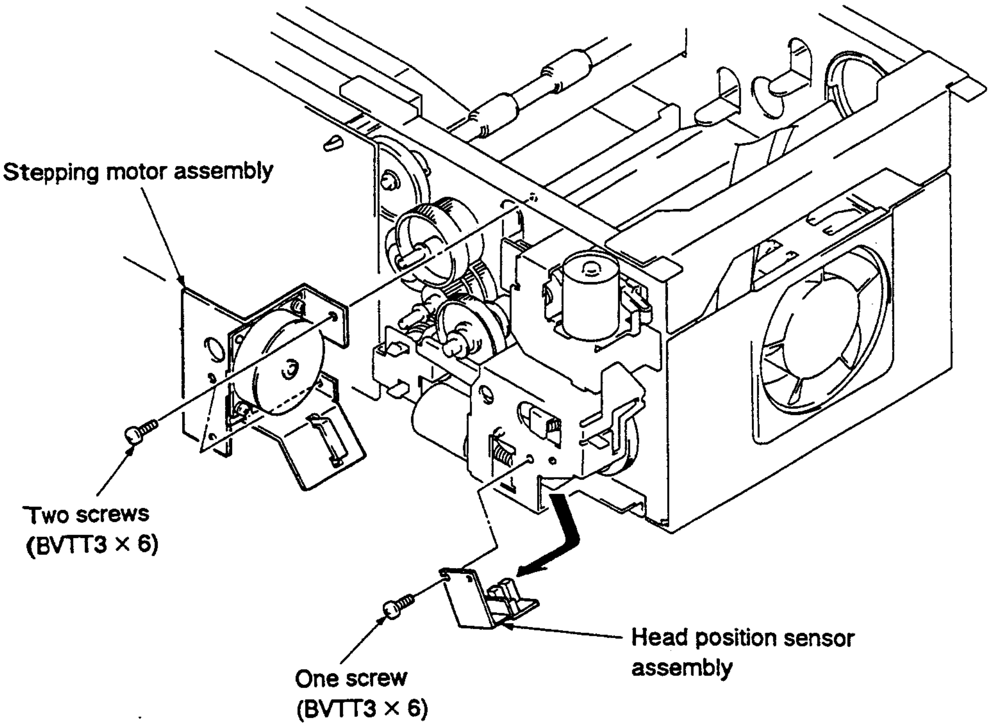
2) Remove the two screws and remove the center guide assembly in the direction of arrow.


Two screws
(BVTT3 × 6)
Center guide
assembly

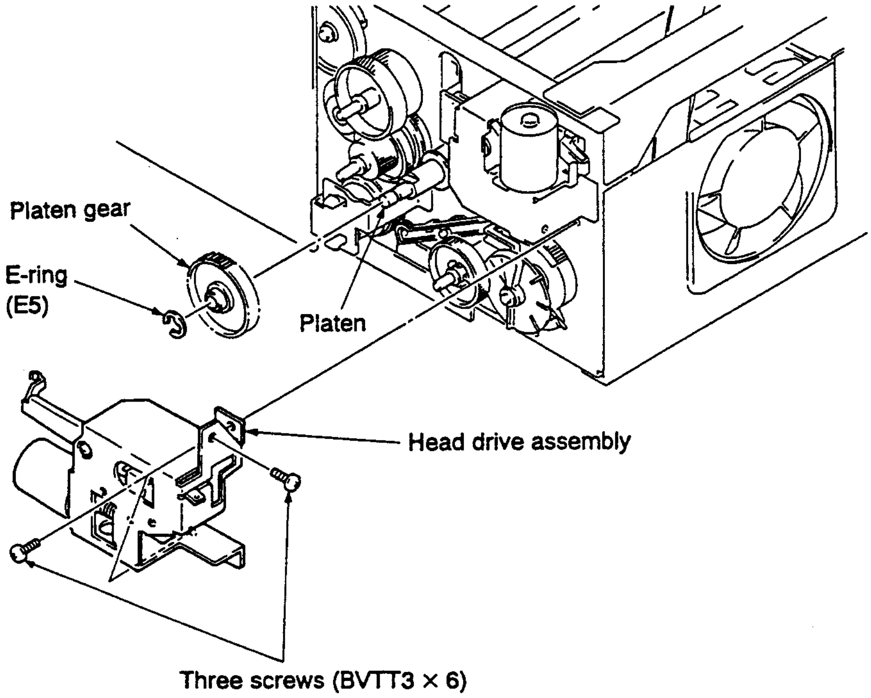
3) Remove the two screws and remove the feed guide (upper) in the direction of arrow Ⓐ.
4) Remove the two screws and remove the pinch roller arm section assembly in the direction of arrow Ⓑ.


Two screws
(BVTT3 × 6)
Pinch roller arm
section assembly
Two screws
(BVTT3 × 6)
Ⓐ
Ⓑ
Feed guide (upper)

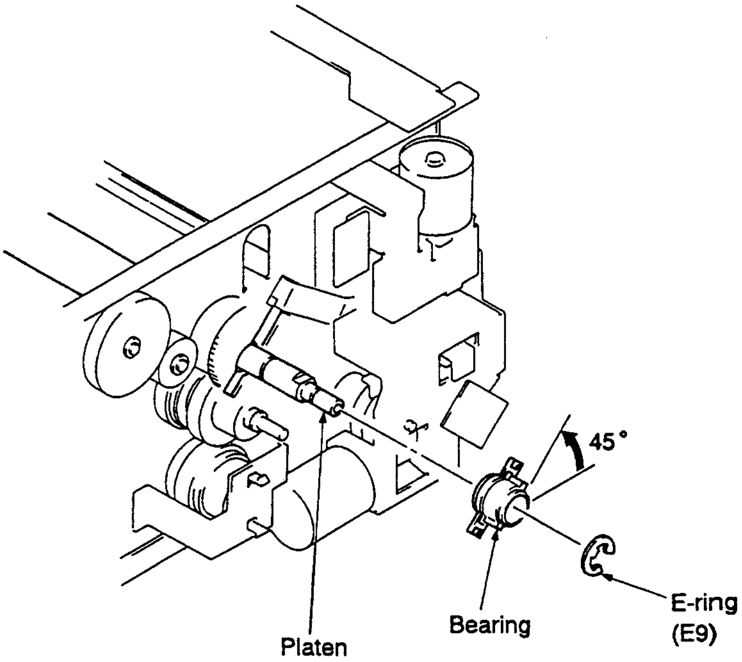
5) Remove the two screws and remove the stepping motor assembly.
6) Remove the single screw and remove the head position sensor assembly in the direction of arrow.


Stepping motor assembly
Two screws
(BVTT3 × 6)
One screw
(BVTT3 × 6)
Head position sensor
assembly

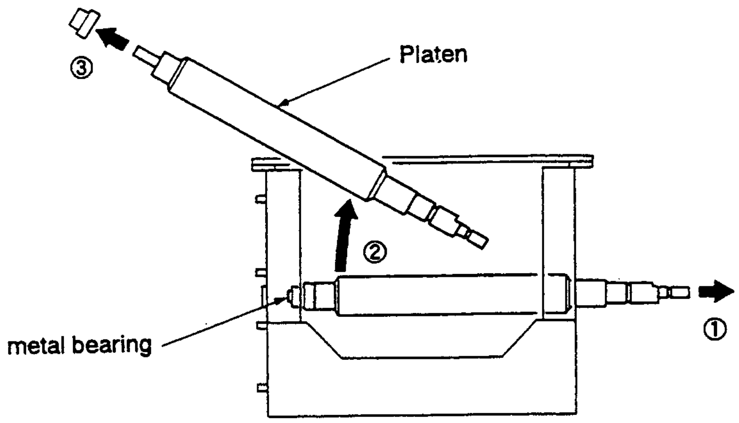
7) Remove the three screws and remove the head drive assembly.
8) Remove the E-ring and pull off the platen gear from the shaft.


Platen gear
E-ring
(E5)
Platen
Head drive assembly
Three screws (BVTT3 × 6)

9) Remove the E-ring, rotate the bearing 45°, and remove from the shaft.

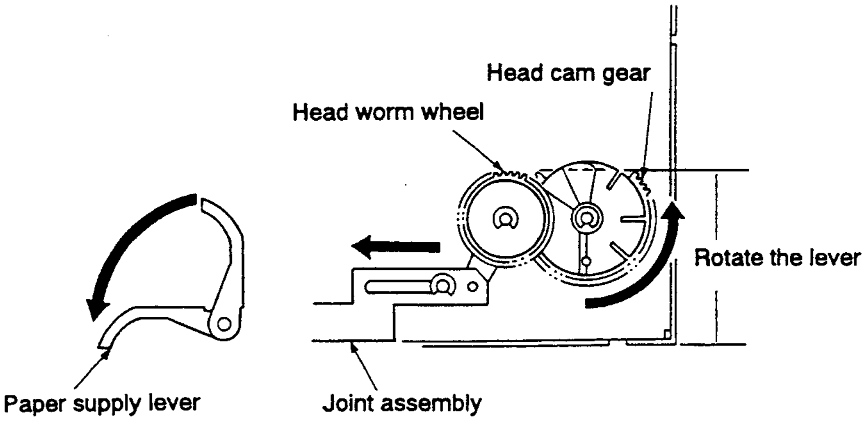

45°
E-ring
(E9)
Bearing
Platen

10) Remove the metal bearing and remove the platen by pulling out one end at a time.


③
Platen
②
metal bearing
①

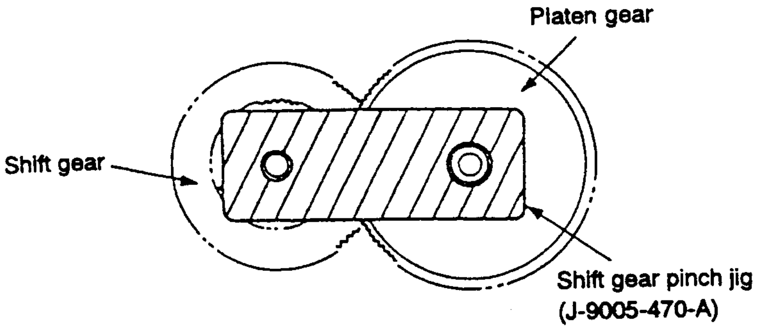
11) Replace the platen. (Apply Sony oil to the attachment position for the shaft holder.)

Note 1: In case, replacing or removing head drive assembly, rotate the head cam gear in the counterclockwise direction, stop when the cut-out section is level, and attach the head drive assembly after making sure that the paper supply lever comes down.


Head cam gear
Head worm wheel
Rotate the lever
Paper supply lever
Joint assembly

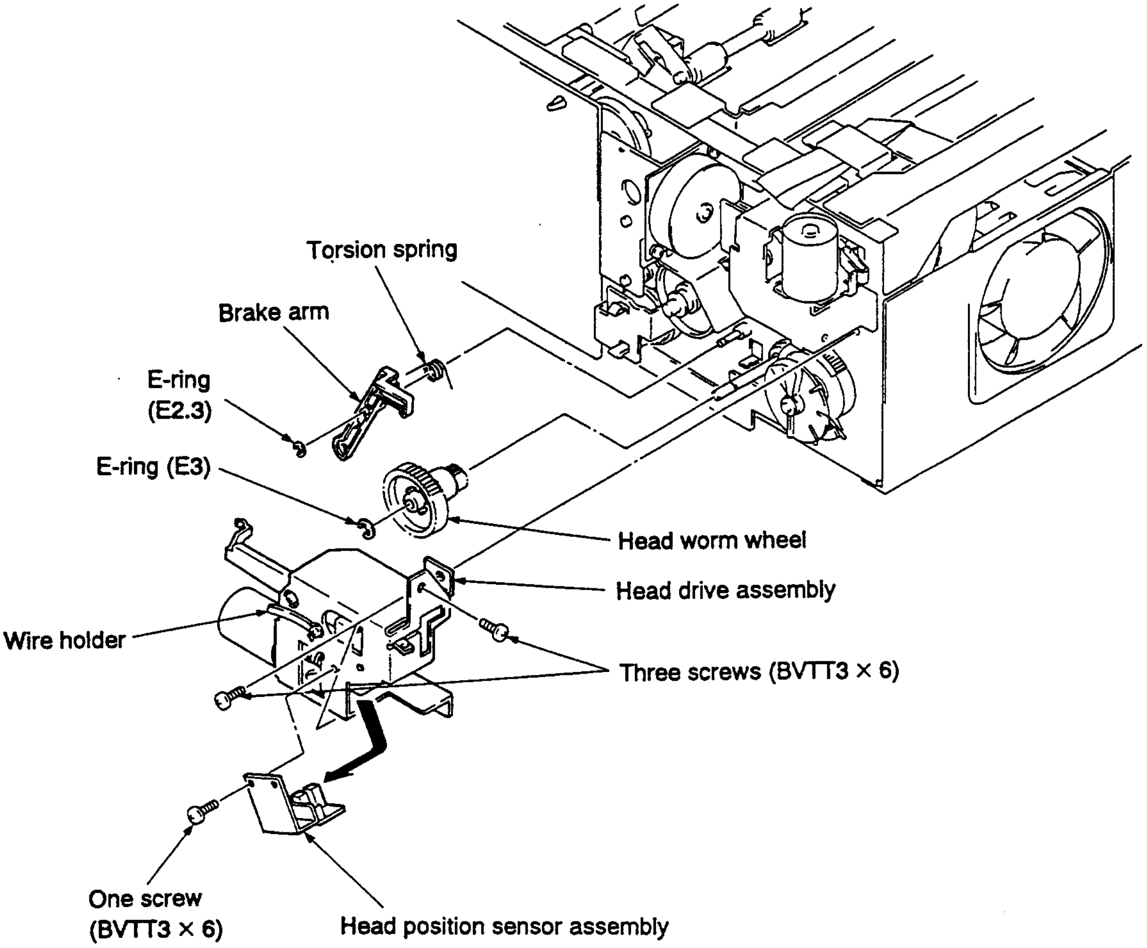
Note 2: When attaching the stepping motor assembly, make sure that there is some play between the worm wheel and worm gear.

Note 3: In case, replacing or removing stepping motor ass'y, adjust pitch between shift gear and platen gear by using shift gear pitch jig.


Platen gear
Shift gear
Shift gear pinch jig
(J-9005-470-A)

8-2-4. Replacement of Brake Arm

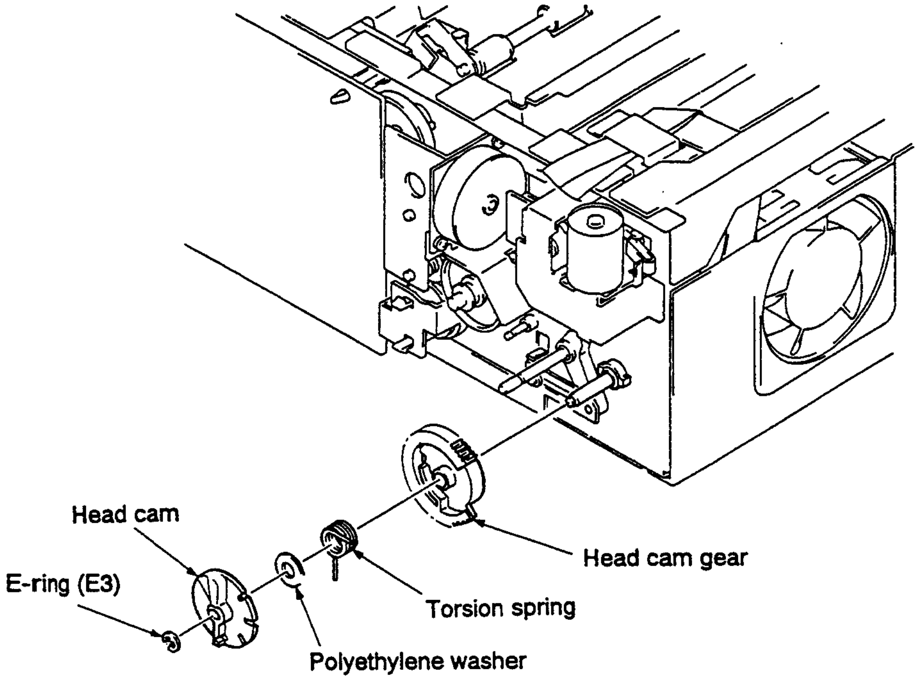
1) Remove the single screw and remove the head position sensor assembly in the direction of arrow.
2) Remove the three screws and remove the head drive assembly. (Bend the wire holder and remove the harness.)
3) Remove the E-ring and pull off the head worm wheel from the shaft.
4) Remove the E-ring and remove the brake arm.


Torsion spring
Brake arm
E-ring (E2.3)
E-ring (E3)
Head worm wheel
Head drive assembly
Wire holder
Three screws (BVTT3 × 6)
One screw (BVTT3 × 6)
Head position sensor assembly

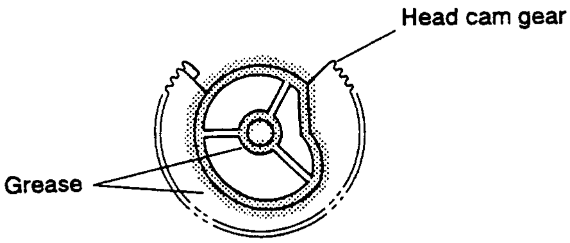
5) Replace the brake arm and attach.

8-2-5. Replacement of Head Worm Wheel, Head Cam Gear, and Head Cam

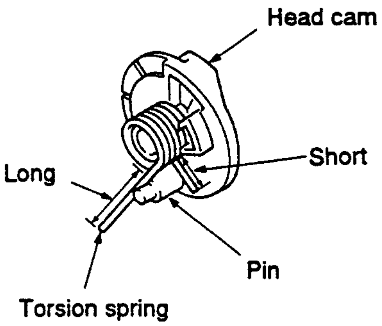
1) Remove the head drive assembly, head worm wheel, and brake arm as described in steps 1) through 4) of 4.
2) Remove the E-ring and pull off the head cam, polyethylene washer, torsion spring, and head cam gear from the shaft in this order.
3) Inspect the head worm wheel, head cam, polyethylene washer, torsion spring, and head cam gear and replace any of these parts if necessary.


Head cam
E-ring (E3)
Head cam gear
Torsion spring
Polyethylene washer

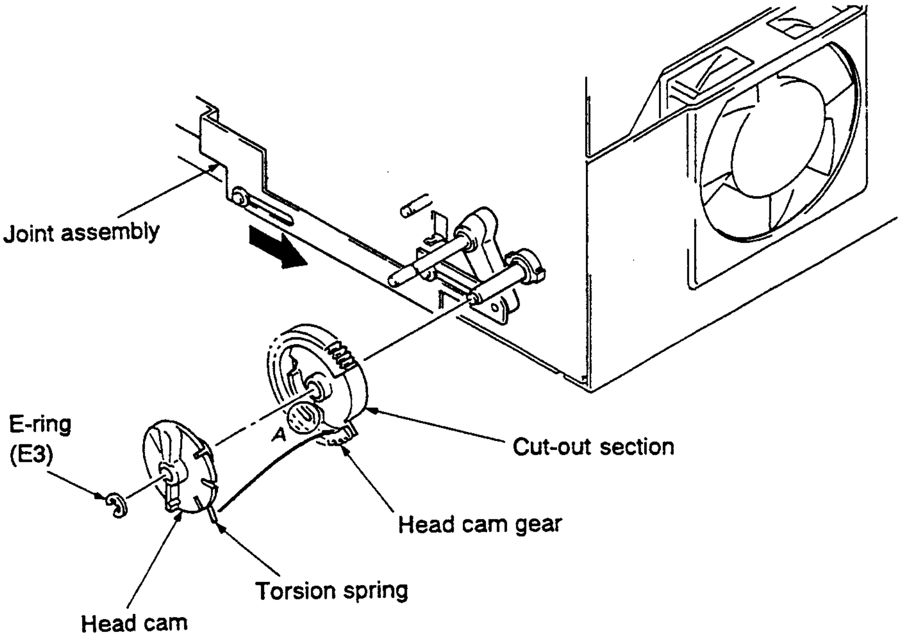
4) Apply Sony grease to the outside of the cam section of the head cam gear and to both ends of the boss, and attach to the shaft.


Head cam gear
Grease

5) Attach the polyethylene washer and torsion spring to the head cam boss in this order, and make sure that both sides of the torsion spring sandwich the head cam pin. (Attach so that the short end of the torsion spring is at the base of the boss.)


Head cam
Short
Long
Pin
Torsion spring

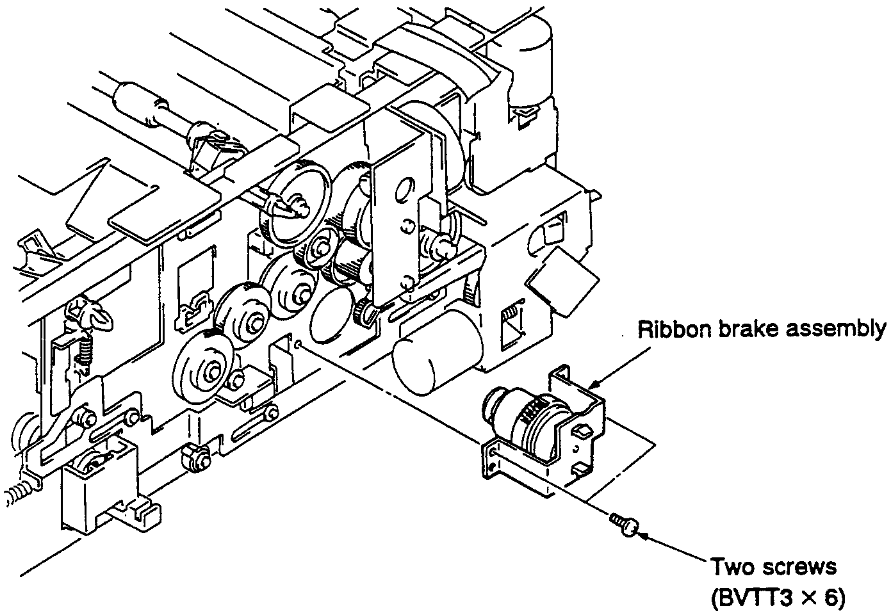
6) With the joint assembly pushed fully to the right, push in the head cam gear so that it comes into contact with the side chassis with the cut-out area to the right.
7) Gently line up the cut-out section of the head cam with the head of the shaft and insert.
8) Insert the tip of the head cam pin into section A of the head cam gear while making sure that the spring does not come off.
9) Hang the long end of the torsion spring on the projection at the cut-out section of the head cam gear.
10) Rotate the head cam gear in the counterclockwise direction, make sure that the paper feed lever comes down when cut-out section is at the top. Attach the E-ring to hold the head cam in place.



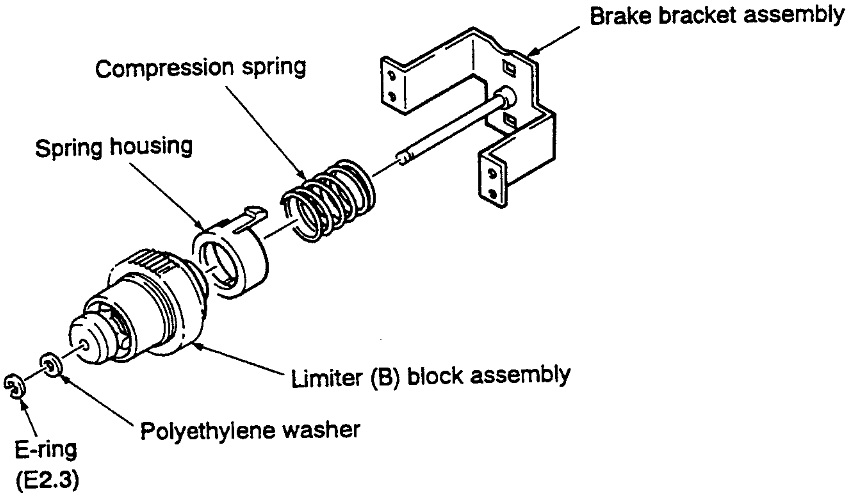
11) Attach the brake arm, head worm wheel, and head drive assembly.

8-2-6. Replacement of Limiter (B) Block Assembly (Ribbon Brake Assembly)

1) Remove the two screws and remove the ribbon brake assembly.


Ribbon brake assembly
Two screws
(BVTT3 × 6)

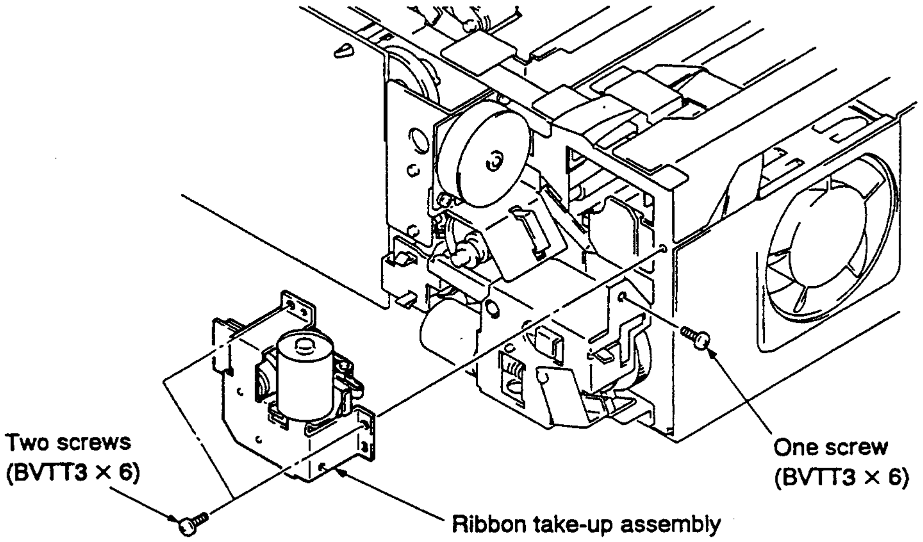
2) Remove the E-ring, polyethylene washer, and limiter (B) block assembly from the shaft in this order.


Brake bracket assembly
Compression spring
Spring housing
Limiter (B) block assembly
Polyethylene washer
E-ring
(E2.3)

3) Replace the limiter (B) block assembly and attach.

8-2-7. Replacement of Limiter Idler Gear and Limiter (A) Block Assembly

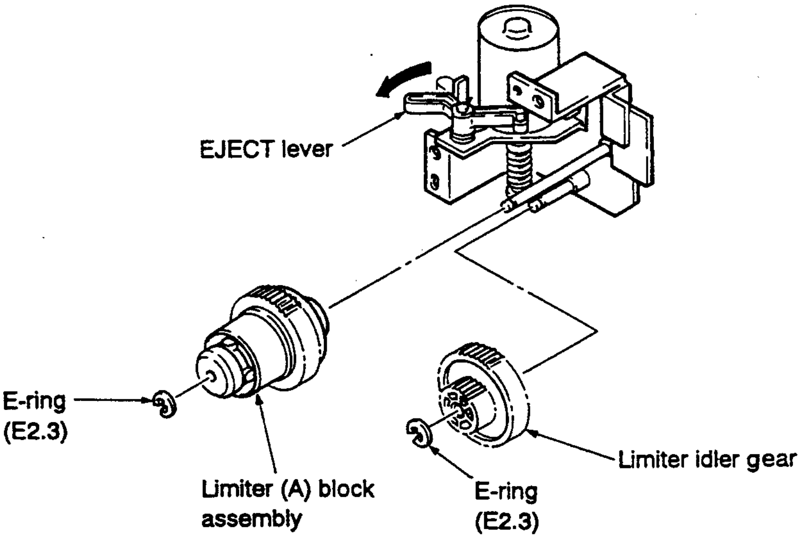
1) Remove the three screws and remove the ribbon takeup assembly.


Two screws
(BVTT3 × 6)
One screw
(BVTT3 × 6)
Ribbon take-up assembly

2) Remove the E-ring and limiter (A) block assembly from the shaft.

Note: The limiter (A) block assembly will normally come into contact with the EJECT lever when removing. In order to prevent this, push the EJECT lever down as far as possible and then remove the limiter (A) block assembly.

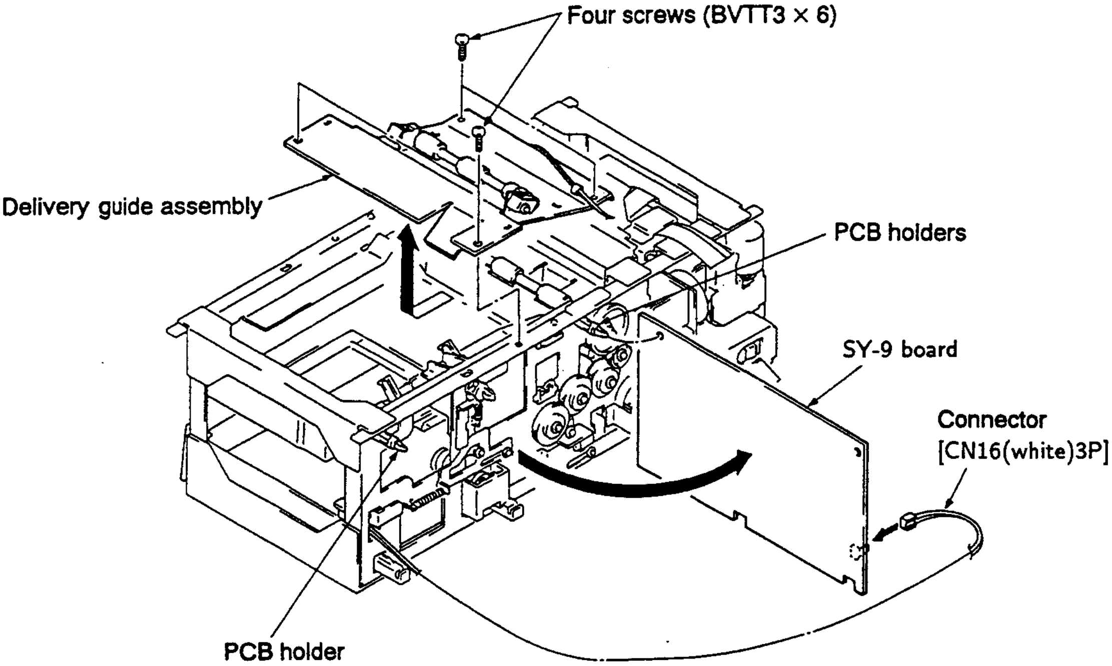
3) Remove the E-ring and pull off the limiter idler gear.


EJECT lever
E-ring
(E2.3)
Limiter (A) block
assembly
E-ring
(E2.3)
Limiter idler gear

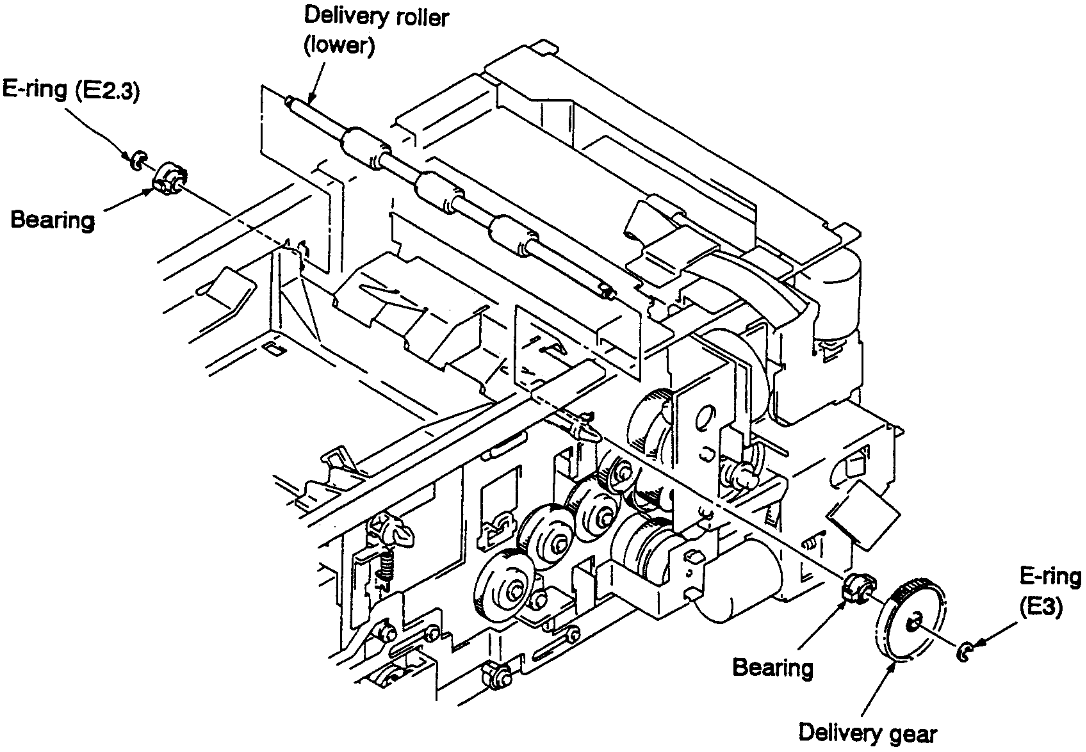
4) Replace the limiter idler gear and/or limiter (A) block assembly if necessary, and reattach.

8-2-8. Removal of Delivery Roller (Lower) and Delivery Gear

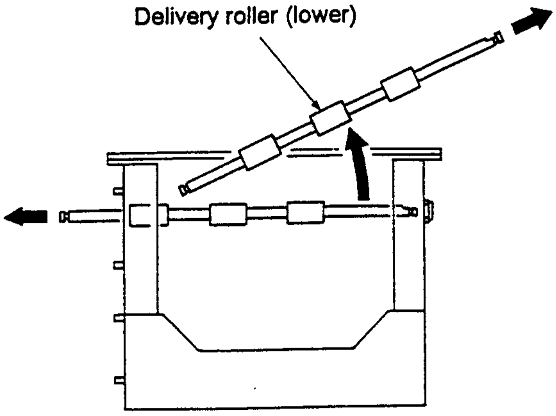
1) Remove the four screws and remove the mechanical shield plate.
2) Remove the four screws, lug and remove the delivery guide assembly.
3) Open the SY-9 board as described in steps 3) and 4) of 2.


Four screws (BVTT3 × 6)
Delivery guide assembly
PCB holders
SY-9 board
Connector
[CN16(white)3P]
PCB holder

4) Remove the E-ring and pull off the delivery gear and bearing.
5) Remove the other E-ring and remove the bearing.


Delivery roller
(lower)
E-ring (E2.3)
Bearing
E-ring
(E3)
Bearing
Delivery gear

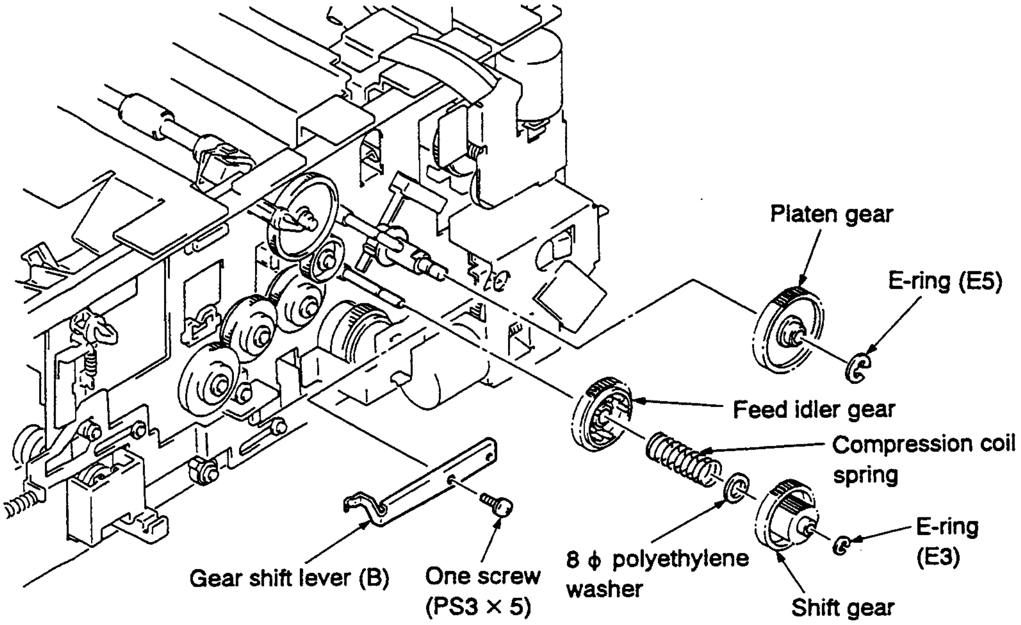
6) Remove the delivery roller (lower) by pulling out one side and then the other, and remove from the main unit.



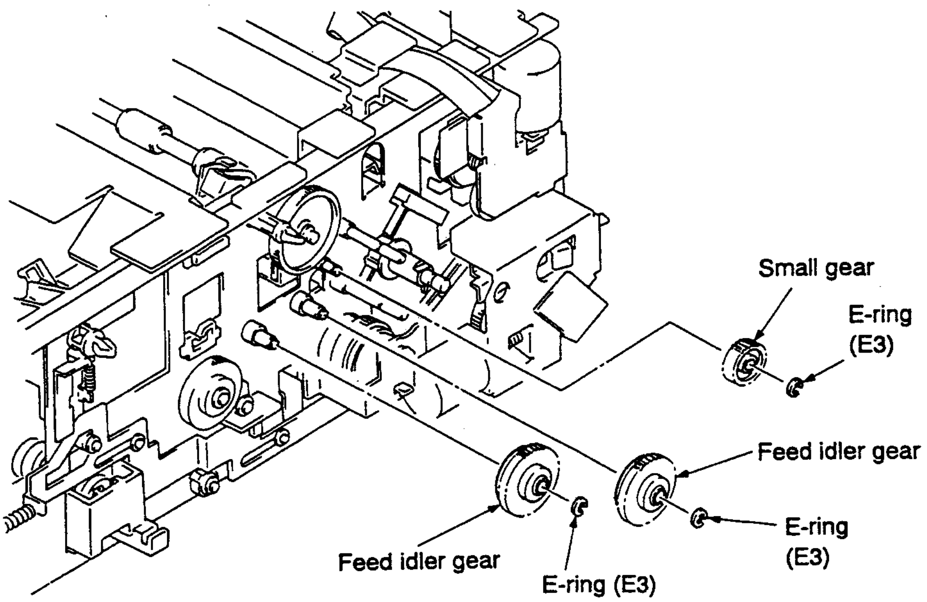
7) Replace the delivery roller (lower) and/or delivery gear if necessary.
8) Apply Sony oil to both ends (width 20 – 30 mm) of the delivery roller (lower) shaft and attach.
   * Sony Oil

8-2-9. Replacement of Shift Gear and Feed Idler Gear

1) Open the SY-9 board as described in steps 3) and 4) of 2.
2) Remove the stepping motor assembly and worm wheel as described in steps 1) and 2) of 1.
3) Remove the single screw and remove the gear shift lever (B) attached to the head drive assembly.
4) Remove the E-ring and pull off the platen gear from the shaft.
5) Remove the E-ring and pull off the shift gear, 8ϕ polyethylene washer, compression coil spring, and feed idler gear from the shaft in this order.

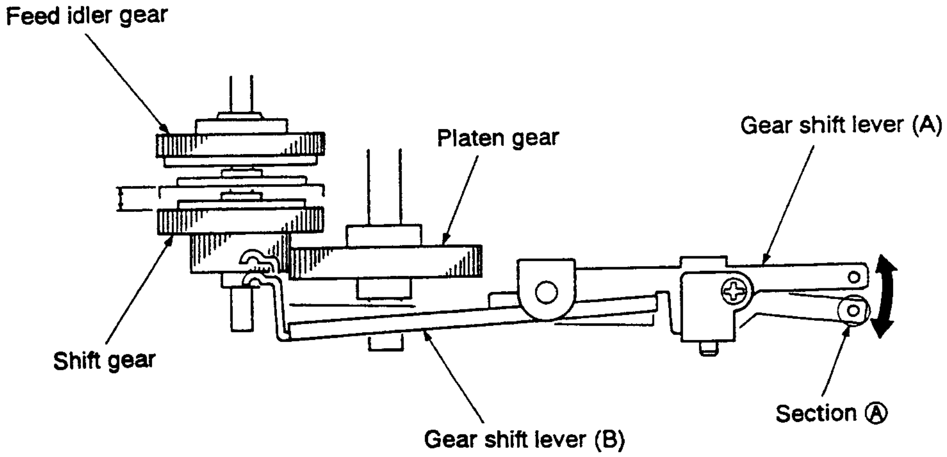

Platen gear
E-ring (E5)
Feed idler gear
Compression coil spring
E-ring (E3)
8 ϕ polyethylene washer
Shift gear
Gear shift lever (B)
One screw (PS3 × 5)

6) Remove the E-ring and remove the small gear.
7) Remove the two E-rings and remove the two feed idler gears from their respective shafts.


Small gear
E-ring
(E3)
Feed idler gear
E-ring
(E3)
Feed idler gear
E-ring (E3)

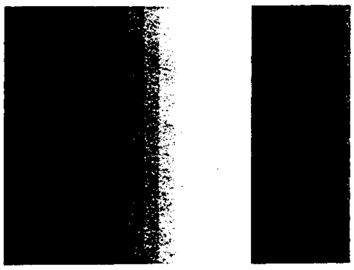
8) Replace the shift gear and/or two feed idler gears if necessary, and reattach.

Note: When it is difficult to attach the gear shift lever (B), attach while pressing on the shift gear with your finger. After attachment, confirm that the gear shift lever (B) presses against the shift gear, and that the shift lever moves when the section of the gear shift lever (A) is pushed with your finger.
: Be careful that gear shift lever (B) does not scratch the teeth of shift gear when it is mounting.


Feed idler gear
Platen gear
Gear shift lever (A)
Shift gear
Section Ⓐ
Gear shift lever (B)

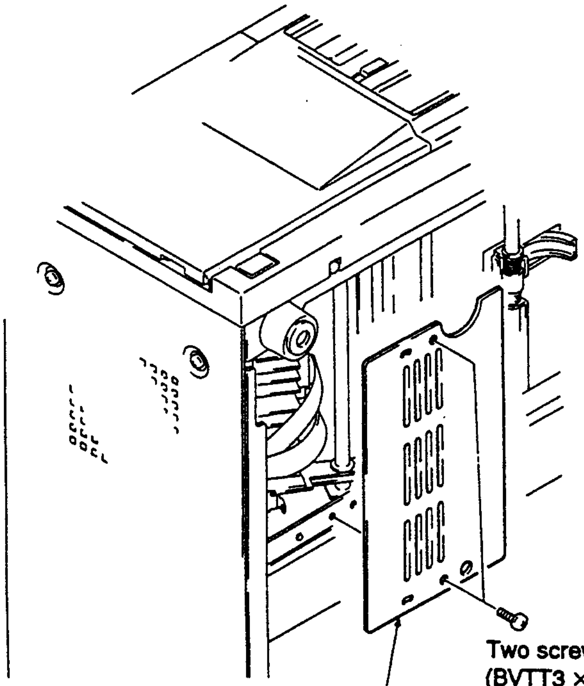
8-2-10. Replacing of Thermal Head

1) Before replacing, print out two sheets using the signal of service mode 1 (16 stair steps signal). (The second sheet is used as reference for density comparing after replacing the head.)

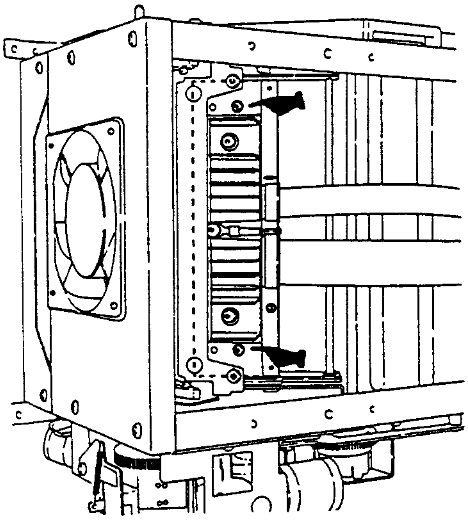


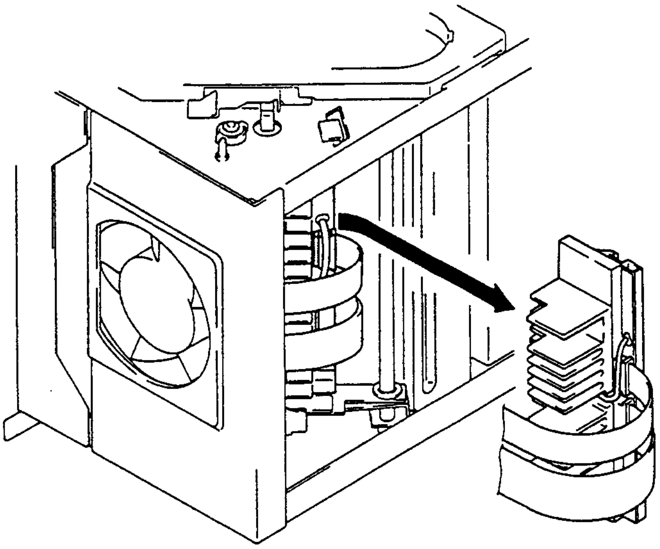
16 Stair steps

2) Remove the bottom panel so as to remove the reinforcement (E).


Two screws
(BVTT3 × 6)
Reinforcement (E)

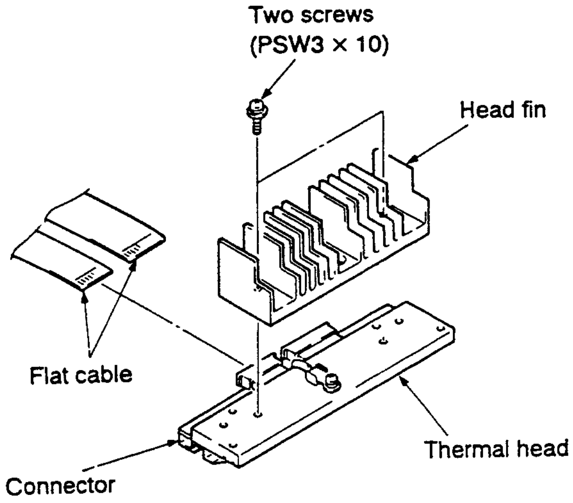
3) Remove two PSW3 × 5 screws shown in the figure and remove the head assembly while turning forward.

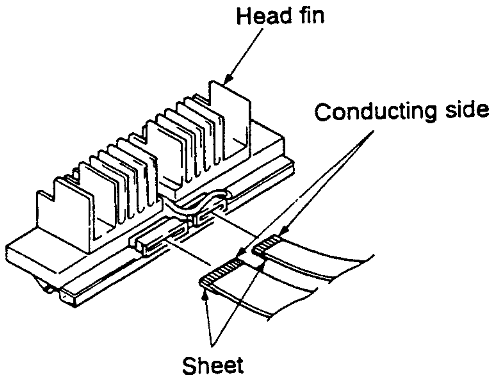


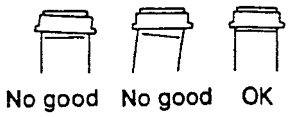


Note: When connecting or disconnecting the flat cable, first pull up the top of the connector.

4) When replacing the head, remove the head fin from the thermal head assembly as shown in the figure below. After replacing the head, reassemble them as before.

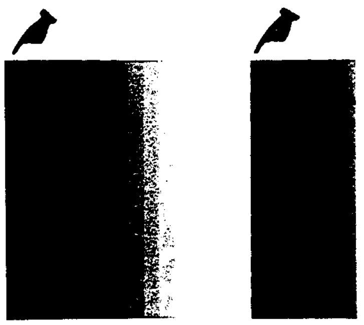

Two screws
(PSW3 x 10)
Head fin
Flat cable
Thermal head
Connector


Head fin
Conducting side
Sheet


No good
No good
OK

5) Remove the upper case and open the FMY-8/ VA-26 board.
Print out 2 copies before replacing the head, and print out more than 2 copies after replacing it. Adjust RV1 so that the density of the black portion of the copy made before replacing the head is the same density as the copy made after replacing the head.
RV1 (SY-9 Board)

Adjustment Method:
Clockwise: UP (↻)
Counterclockwise: Down (↺)



SONY

SONY - SP0167

COLOR VIDEO PRINTER

UP-5100SERIES

SERVICE MANUAL

SUPPLEMENT-1

Please add and replace your manual with this SUPPLEMENT-1.

SUBJECT

- THEORY OF OPERATION

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1. ANALOG VIDEO SYSTEM (IF-19, VA-26, DSC-8 and DSC-9 Boards)

1-1. General

Analog system video is composed of the following, An IF-19 Board with a video/interface function, VA-26 Board with a video signal input processing and output processing function, DSC-8 and DSC-9 Boards for volume control (see Fig.1-1).

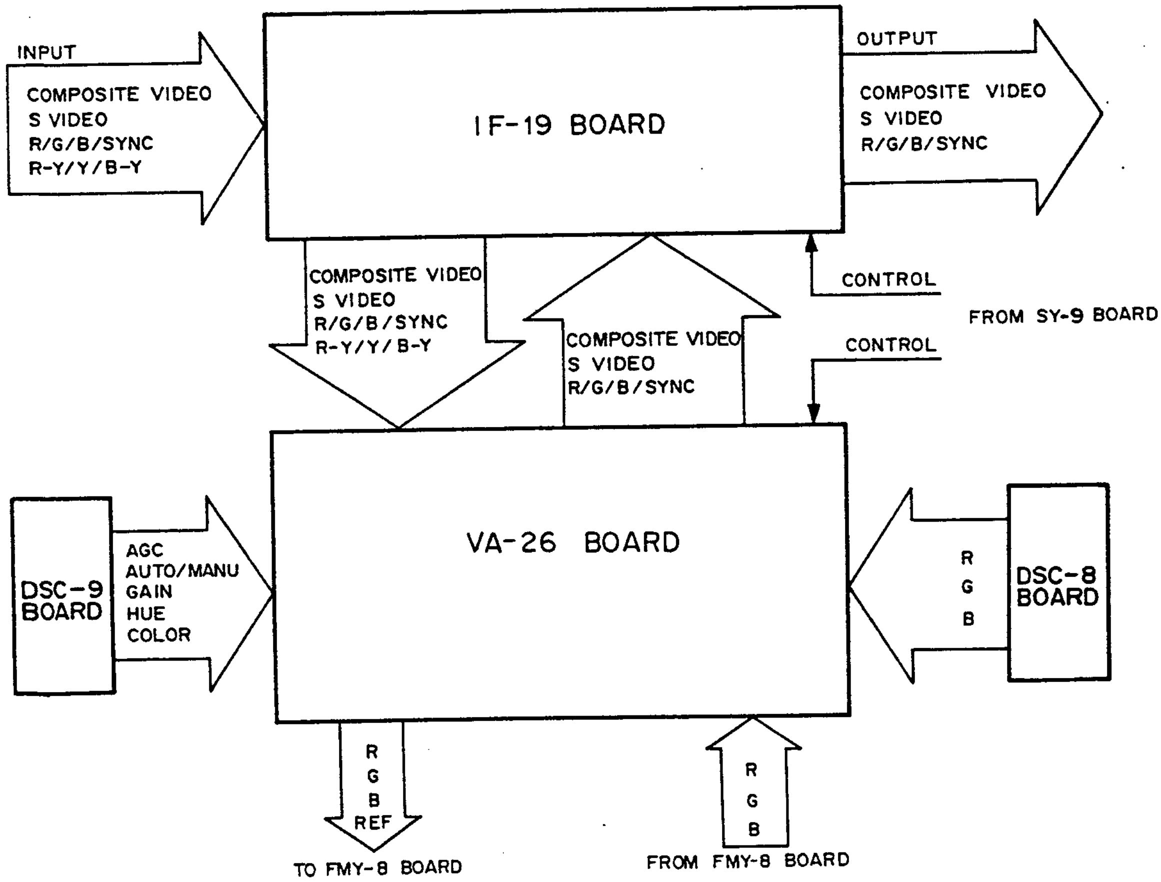

INPUT
COMPOSITE VIDEO
S VIDEO
R/G/B/SYNC
R-Y/Y/B-Y
IF-19 BOARD
OUTPUT
COMPOSITE VIDEO
S VIDEO
R/G/B/SYNC
COMPOSITE VIDEO
S VIDEO
R/G/B/SYNC
R-Y/Y/B-Y
COMPOSITE VIDEO
S VIDEO
R/G/B/SYNC
CONTROL
FROM SY-9 BOARD
CONTROL
VA-26 BOARD
DSC-9 BOARD
AGC
AUTO/MANU
GAIN
HUE
COLOR
R
G
B
DSC-8 BOARD
R
G
B
REF
TO FMY-8 BOARD
R
G
B
FROM FMY-8 BOARD

Fig. 1-1

1-2. IF-19 Board

The IF-19 Board consists of the three blocks shown below, and in order to respond to each video signal, includes the seven circuits shown in Figure 1-2 [COMPOSITE VIDEO, C(S VIDEO), Y(S VIDEO), R, G, B, SYNC].

1) 6dB AMP Block
2) SWITCHER Block
3) 75 Ω DRIVER Block

The video signals input to the IF-19 Board from the outside are terminated by 75 Ω. This signal passes through a buffer after which one part goes to the INPUT circuit of the VA-26 Board and the other part is input to the 6 dB AMP. The signal which is doubled at the 6dB AMP is input to the SWITCHER.
The other input to the SWITCHER is the signal that has passed through the output processing system of the VA-26 Board.
The SWITCHER is changed to the THRU or E to E mode by means of the CONTROL signal from the SY-9 Board. SWITCHER OUT of the THRU mode outputs the signal that has passed through the 6 dB AMP. SWITCHER OUT of the E to E mode outputs the signal that has passed through output processing of the VA-26 Board.
The signal that is output from the SWITCHER passes through the 75 Ω DRIVER and is then output.

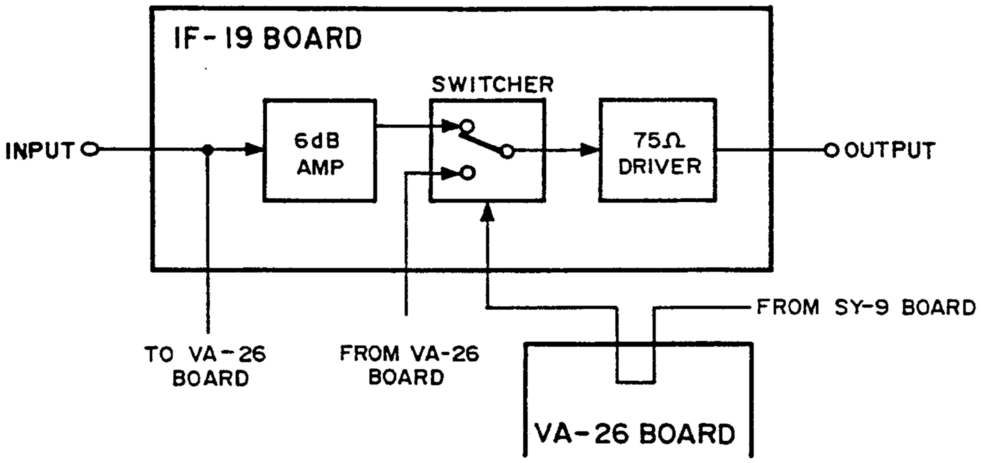


Fig. 1-2

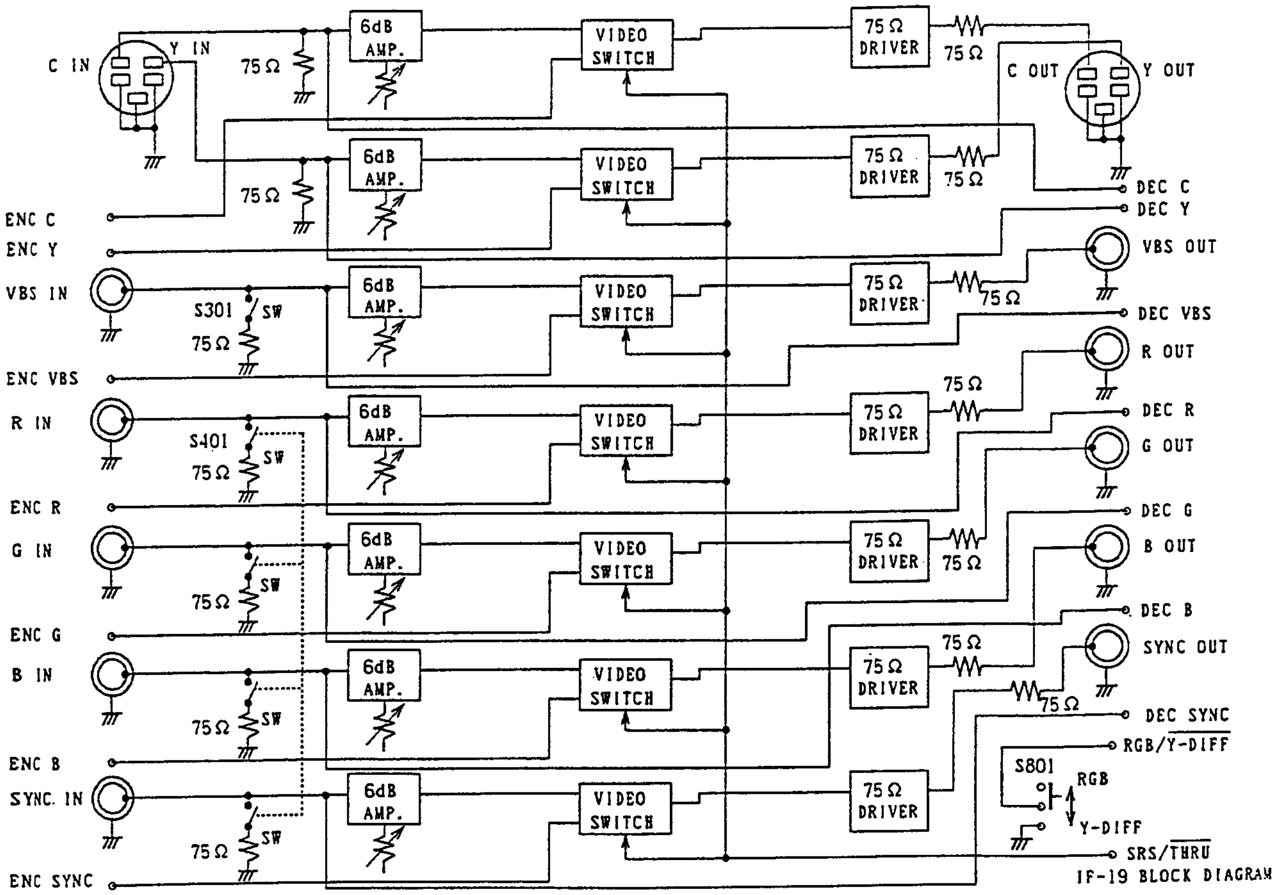

C IN
Y IN
75Ω
6dB AMP.
VIDEO SWITCH
75Ω DRIVER
75Ω
C OUT
Y OUT
DEC C
DEC Y
ENC C
ENC Y
VBS OUT
VBS IN
S301
SW
DEC VBS
ENC VBS
R OUT
R IN
S401
DEC R
G OUT
ENC R
DEC G
G IN
B OUT
ENC G
DEC B
B IN
SYNC OUT
DEC SYNC
RGB/$\overline{\text{Y-DIFF}}$
S801
RGB
Y-DIFF
ENC B
SYNC. IN
SRS/$\overline{\text{THRU}}$
ENC SYNC
IF-19 BLOCK DIAGRAM

Fig. 1-3 IF-19 Board Block Diagram

2. VIDEO SYNC SIGNAL (VA-26BOARD)

2-1. General

The processing system for synchronous signals is composed of the following contents.

1) Synchronous signal selection circuit
2) SYNC/SEP circuit
3) CLAMP PULSE generation circuit
4) VD separation circuit
5) H BLANKING circuit
6) V BLANKING circuit
7) AFC circuit
8) INT SYNC generation circuit
9) INT/EXT changing circuit
10) BF generation circuit

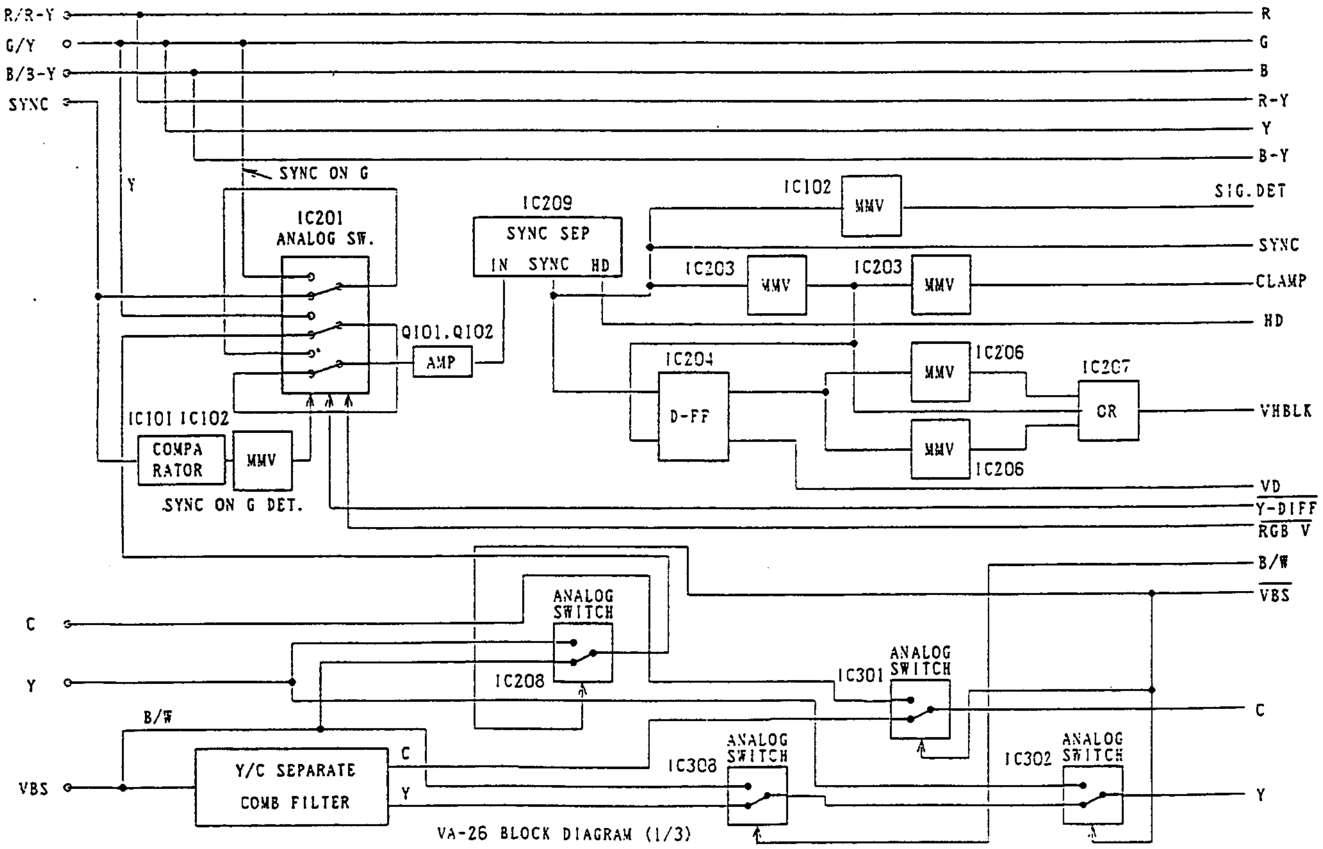

R/R-Y
G/Y
B/B-Y
SYNC
R
G
B
R-Y
Y
B-Y
Y
SYNC ON G
IC201
ANALOG SW.
IC209
SYNC SEP
IN SYNC HD
IC102
MMV
SIG. DET
SYNC
IC203
MMV
IC203
MMV
CLAMP
HD
Q101.Q102
AMP
IC204
D-FF
IC206
MMV
IC207
OR
VHBLK
MMV
IC206
IC101 IC102
COMPA RATOR
MMV
SYNC ON G DET.
VD
Y-DIFF
RGB V
B/W
VBS
C
ANALOG SWITCH
IC208
Y
B/W
IC301
ANALOG SWITCH
C
VBS
Y/C SEPARATE
COMB FILTER
C
Y
IC308
ANALOG SWITCH
IC302
ANALOG SWITCH
Y
VA-26 BLOCK DIAGRAM (1/3)

Fig. 2-1 VA-26 Board Block Diagram (1/3)

2-2. Sync Signal Selection Circuit

Synchronous signal selection is carried out with the analog switch of IC201.
The video signals that have been selected according to the mode of the individual video signals are sent to the SYNC/SEP BLOCK.

• SYNC automatic detection of RGB component signal.

There are the two types of that when the RGB component signals include signals in which the SYNC is independent, and signals in which the SYNC has been added to the G signal (SYNC on G).
In the VA-26 Board, viewing the SYNC of the RGB signal input from the Pin 7 of CN101 is used to determine whether it is SYNC on G.

• SYNC on G DET Block (IC101, IC102)

The SYNC signal from the Pin 7 of CN101 undergoes CD cut and is input to MINUS INPUT terminal of the Pin 2 of comparator IC101.
The threshold is set at approximately -0.12V. When the SYNC signal Pin 3 of IC101 is input, the IC101 output Pin 1 of IC101 generates a pulse according to the SYNC cycle. This pulse is input to the Pin 1 of the re-trigger mono/multi IC102. As long as the pulse is input with an H cycle, the Pin 13 of IC102 is maintained at HIGH.
The Pin 13 of IC102 is connected to the control terminal Pin 9 of IC201. At this time, IC201 selects SYNC as a synchronous signal. During SYNC on G, the Pin 7 of CN101 has no signal input and the Pin 13 of IC102 goes to LOW. IC201 selects the G signal as a synchronous signal.

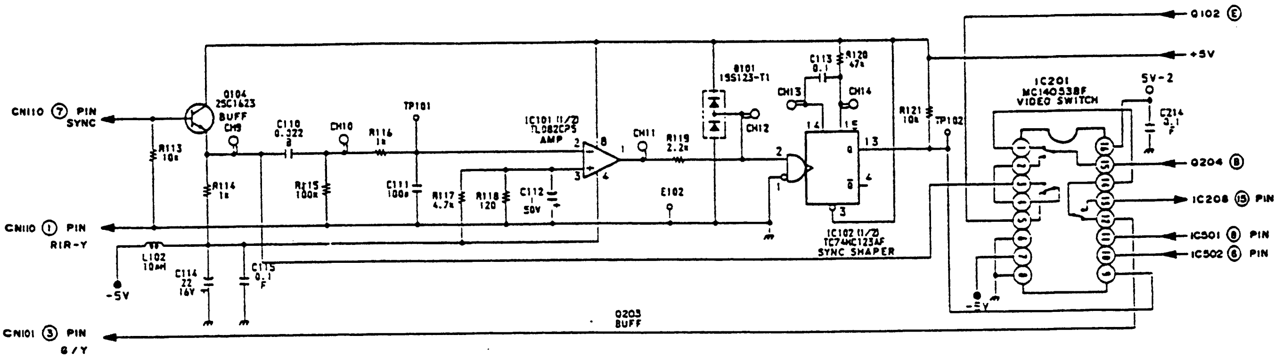

CN110 ⑦ PIN SYNC
CN110 ① PIN R/R-Y
CN101 ③ PIN G/Y
Q104 2SC1623 BUFF
R113 10k
R114 1k
CH9
C110 0.022
CH10
R115 100k
R116 1k
TP101
C111 100p
R117 4.7k
R118 120
C112 1 50V
IC101 (1/2) TL082CPS AMP
L102 10μH
-5V
C114 22 16V
C115 0.1 F
CH11
R119 2.2k
E102
D101 1SS123-T1
CH12
C113 0.1
R120 47k
CH13
CH14
IC102 (1/2) TC74HC123AF SYNC SHAPER
R121 10k
TP102
IC201 MC14053BF VIDEO SWITCH
5V-2
C214 0.1 F
Q102 Ⓔ
+5V
Q204 Ⓑ
IC208 ⑮ PIN
IC501 ⑧ PIN
IC502 ⑥ PIN
Q203 BUFF
-5V

Fig. 2-2 Sync signal selection circuit

2-3. SYNC/SEP Circuit

The video signal selected by analog switch IC201 is output from the Pin 15. It is amplified 1.5 times in the Q201 and Q202 AMP circuits.

The amplified signal undergoes SYNC TIP CLAMP in D201. It passes through a 3.58 MHz trap consisting of R216, L203, C216 and C217 and is input to the Pin 1 of SYNC/SEP IC209. The signal that is input to the Pin 1 of IC209 undergoes SYNC/SEP. There is then output of a positive polarity COMPOSITE SYNC from the Pin 4 and output of a positive polarity HD signal from the Pin 8 after passing half H killer.

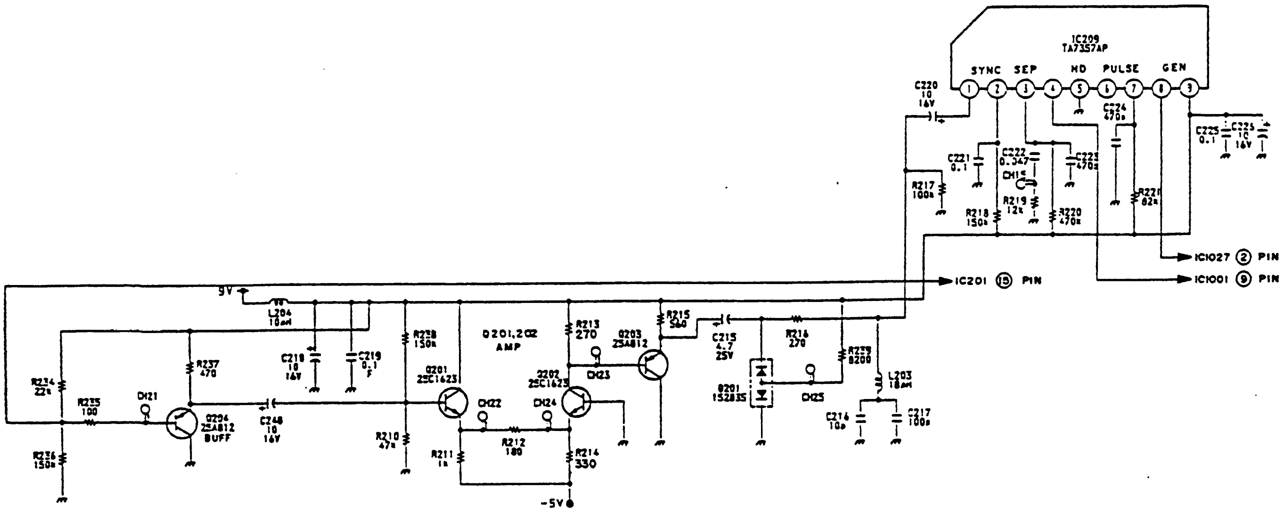

IC209
TA7357AP
SYNC SEP HD PULSE GEN
C220 10 16V
C221 0.1
C222 0.047
CH15
R219 12k
C223 470p
C224 470p
R221 82k
C225 0.1
C226 10 16V
R217 100k
R218 150k
R220 470k
IC1027 ② PIN
IC1001 ⑨ PIN
IC201 ⑮ PIN
9V
L204 10μH
R234 22k
R235 100
CH21
Q204 2SA812 BUFF
R236 150k
R237 470
C218 10 16V
C219 0.1 F
C248 10 16V
R238 150k
R210 47k
Q201,202 AMP
Q201 2SC1623
Q202 2SC1623
CH22
CH24
R211 1k
R212 180
R213 270
R214 330
-5V
Q203 2SA812
CH23
R215 560
C215 4.7 25V
D201 1S2835
R216 270
CH25
R239 8200
L203 18μH
C216 10p
C217 100p

Fig. 2-3 SYNC/SEP Circuit

2-4. VD Separation Circuit

The COMPOSITE SYNC that has undergone SYNC/SEP is input to the Pin 2 of IC203. It is simultaneously input to the Pin 2 of IC204.

The signal is output from the Pin 4 of IC203 and this is input to the clock of the Pin 3 of IC204. A negative polarity V SYNC is separated from the Pin 6 of IC204 and is output.

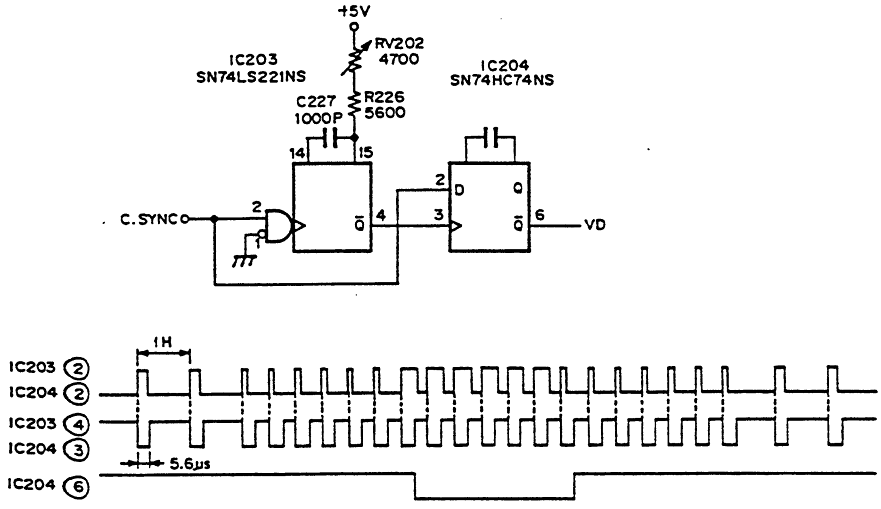

+5V
RV202 4700
IC203 SN74LS221NS
C227 1000P
R226 5600
14
15
IC204 SN74HC74NS
C.SYNC
2
1
4
Q̄
2
3
D
Q
Q̄
6
VD
1H
IC203 ②
IC204 ②
IC203 ④
IC204 ③
5.6μs
IC204 ⑥

Fig. 2-4 VD Separation Circuit

2-5. CLAMP PULSE Generation Circuit

The Pin 13 output of IC203, which has been increased to 5.6 μsec, is input to the Pin 9 of IC203. A negative polarity CLAMP PULSE is obtained from the output of the Pin 12. This signal is inverted at Q33 to operate the individual CLAMP transistors.
In addition, because there is MISCLAMP during the V SYNC interval, VD is input to the Pin 11 CLR of IC203 so that the CLAMP PULSE is stopped during this interval.

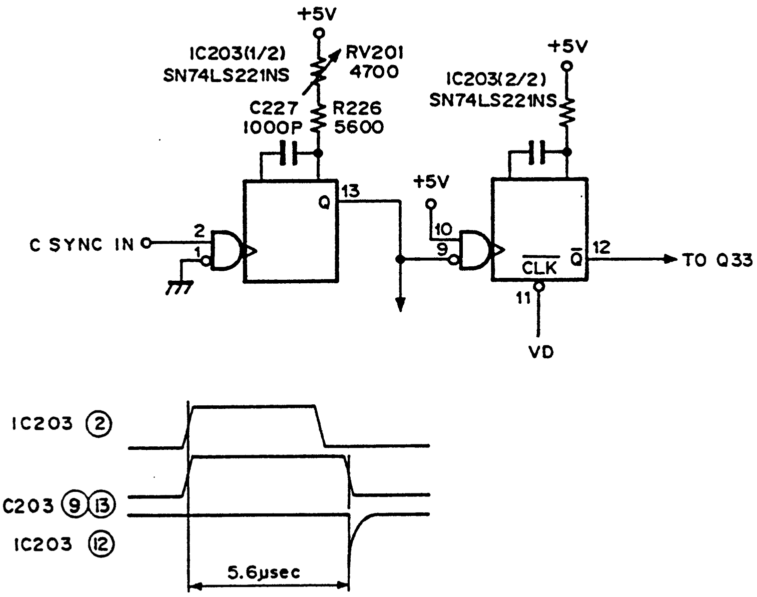

+5V
IC203(1/2)
SN74LS221NS
RV201
4700
C227
1000P
R226
5600
+5V
IC203(2/2)
SN74LS221NS
+5V
C SYNC IN
2
1
Q
13
10
9
CLK
Q̄
12
TO Q33
11
VD
IC203 ②
IC203 ⑨⑬
IC203 ⑫
5.6μsec

Fig. 2-5 CLAMP PULSE Generation Circuit

2-6. H Blanking Circuit

The H Blanking pulse determines the position of the CLAMP PULSE. It uses the output pulse of the Pin 13 of IC203.

2-7. V Blanking Circuit

The V Blanking pulse creates a positive polarity VD from the Pin 5 of IC204 for the Pin 4 and Pin 11 of IC206. At IC206 the output is returned to input and this is used as non-retriggable M.M.V.
A pulse that is approximately 6H from the rise of VD is output from the Pin 6 of IC206.
A pulse equal to approximately 7 H until the fall of VD is output from the Pin 9 of IC206.
(A pulse equal to approximately 255 H from the fall of VD is output from the Pin 10).
The output from the Pin 9 of IC206 is input to the Pin 9 of IC207. And is output from the Pin 8 of IC207.
This V Blanking pulse is input to the Pin 5 of IC207. The above-mentioned H circuit pulse is input to the Pin 4 of IC207. The V.H circuit pulse is output from the Pin 6 of IC207 and is then input to the control switch terminals of the Pins 9, 10, 11 of the analog switch IC7. The blanking section is changed so that it is the same DC level as the pedestal.

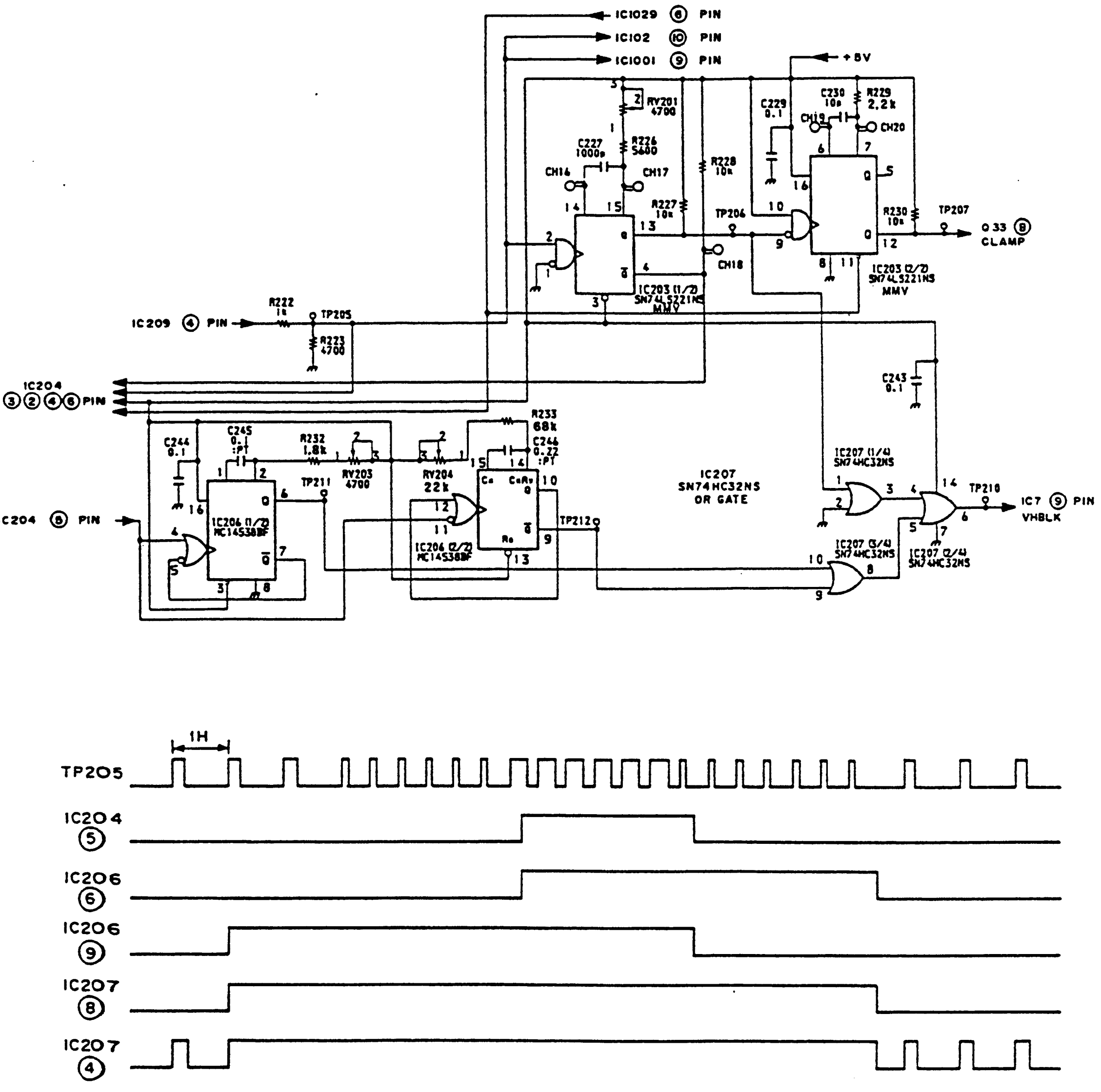

IC1029 ⑥ PIN
IC102 ⑩ PIN
IC1001 ⑨ PIN
+5V
RV201 470Ω
C227 1000p
R226 560Ω
CH16
CH17
R228 10k
R227 10k
TP206
CH18
IC203 (1/2) SN74LS221NS MMV
C229 0.1
C230 10n
R229 2.2k
CH19
CH20
R230 10k
TP207
O33 ⑧ CLAMP
IC203 (2/2) SN74LS221NS MMV
IC209 ④ PIN
R222 1k
TP205
R223 470Ω
IC204 ③②④⑥PIN
IC204 ⑤ PIN
C244 0.1
C245 0.1 :PT
R232 1.8k
TP211
RV203 470Ω
IC206 (1/2) MC14538BF
RV204 22k
R233 68k
C246 0.22 :PT
IC206 (2/2) MC14538BF
TP212
IC207 SN74HC32NS OR GATE
C243 0.1
IC207 (1/4) SN74HC32NS
IC207 (3/4) SN74HC32NS
IC207 (2/4) SN74HC32NS
TP210
IC7 ⑨ PIN VHBLK
1H
TP205
IC204 ⑤
IC206 ⑥
IC206 ⑨
IC207 ⑧
IC207 ④

Fig. 2-6 V Blanking Circuit

2-8. AFC Circuit

An HD signal which has undergone half-H killer is output from the Pin 8 of the IC209, the IC for SYNC/SEP.

The HD signal is input to the mono/multi Pin 2 of IC1027. A sample pulse is generated and is input to the Pin 6 of IC1026, the hybrid IC of the phase comparator. The error voltage is output from the Pin 1 of IC1026. It passes through the error amp IC1142 comprising the LPF and is impressed to the varicap (D1002). This is used to change VCO which emits 4 fsc.

The VCO output is output from the Q1043 emitter and is input to the Pin 2 of the 910 division phase comparator composed of the IC1023, IC1024 and IC1025 counters.

The HD signal locked in this PLL circuit is input to the Pin 9 of the mono/multi IC1027 where the pulse width becomes approximately 5μsec and the signal is input to the INT/EXT changing circuit.

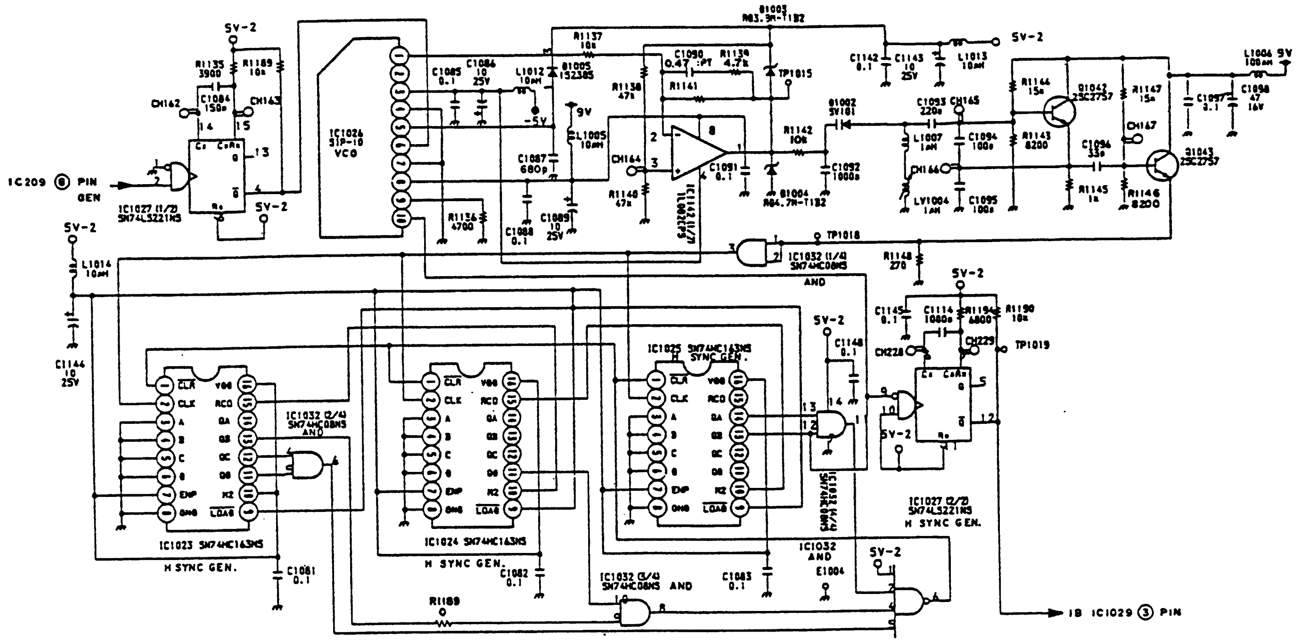

IC209 ⑧ PIN
GEN
IC1027 (1/2)
SN74LS221NS
5V-2
R1135
3900
R1189
10k
C1084
150p
CH162
CH163
IC1026
SIP-10
VCO
C1085
0.1
C1086
10
25V
L1012
10μH
D1005
1S2385
-5V
9V
L1005
10μH
C1087
680p
C1088
0.1
C1089
10
25V
R1136
4700
R1137
10k
R1138
47k
R1140
47k
CH164
C1090
0.47 :PT
R1139
4.7k
R1141
IC1142 (1/2)
TL082CPS
C1091
0.1
D1003
RD3.9M-T1B2
TP1015
D1004
RD4.7M-T1B2
R1142
10k
D1002
SV101
C1092
1000p
C1142
0.1
C1143
10
25V
L1013
10μH
C1093
220p
CH165
L1007
1μH
C1094
100p
CH166
LV1004
1μH
C1095
100p
R1144
15k
R1143
8200
Q1042
2SC2757
C1096
33p
R1145
1k
R1147
15k
CH167
R1146
8200
Q1043
2SC2757
L1006
100μH
9V
C1097
0.1
C1098
47
16V
TP1018
IC1032 (1/4)
SN74HC08NS
AND
R1148
270
L1014
10μH
C1144
10
25V
IC1023 SN74HC163NS
H SYNC GEN.
IC1032 (2/4)
SN74HC08NS
AND
C1081
0.1
IC1024 SN74HC163NS
H SYNC GEN.
C1082
0.1
IC1025 SN74HC163NS
H SYNC GEN.
CLR
CLK
A
B
C
D
ENP
GND
VDD
RCO
QA
QB
QC
QD
ENT
LOAD
C1148
0.1
IC1032 (4/4)
SN74HC08NS
C1145
0.1
C1114
1000p
R1194
6800
R1190
10k
CH228
CH229
TP1019
IC1027 (2/2)
SN74LS221NS
H SYNC GEN.
IC1032 (3/4)
SN74HC08NS AND
R1189
0
C1083
0.1
IC1032
AND
E1004
1B IC1029 ③ PIN

Fig. 2-7 AFC Circuit

2-9. INT SYNC Generation Circuit

The internal synchronous signal employs a synchronous signal emitting IC which was developed for use with color video cameras.

IC1002 connects a 4fsc crystal (X1001) to Pins 25 and Pins 26 to output a COMPOSITE SYNC synchronized with the clock from the Pin 4, an HD signal from the Pin 8, a VD signal from the Pin 12 and an SC signal from the Pin 19.

2-10. INT/EXT Change-Over Circuit

The INT/EXT COMPOSITE SYNC, INT/EXT $\overline{\text{HD}}$ and INT/EXT $\overline{\text{VD}}$ signals are input to the Pin 3 of CN1002 with the data selector IC1029. They are changed by the CONTROL signal IN/$\overline{\text{MEMO}}$ from the FMY-8 Board. During SOURCE, the EXT signal is selected. During MEMORY, NO INPUT, the INT signal is selected. The selected COMPOSITE SYNC is output from the Pin 12, $\overline{\text{HD}}$ from the Pin 4 and $\overline{\text{VD}}$ from the Pin 7 of IC1029.

SC change-over of INT/EXT is carried out at IC1022, IC1001 and IC1003. During SOURCE, the EXT signal is selected only for the VBS and VIDEO signal. The INT signal is selected for the other signals.

A square waveform SC of approximately 5 Vp-p is oscillated by the Pin 8 of IC1003. Thus, the L.P.F. is composed at Q1044, Q1045 and L,C and an SC of approximately 0.6 Vp-p is generated.

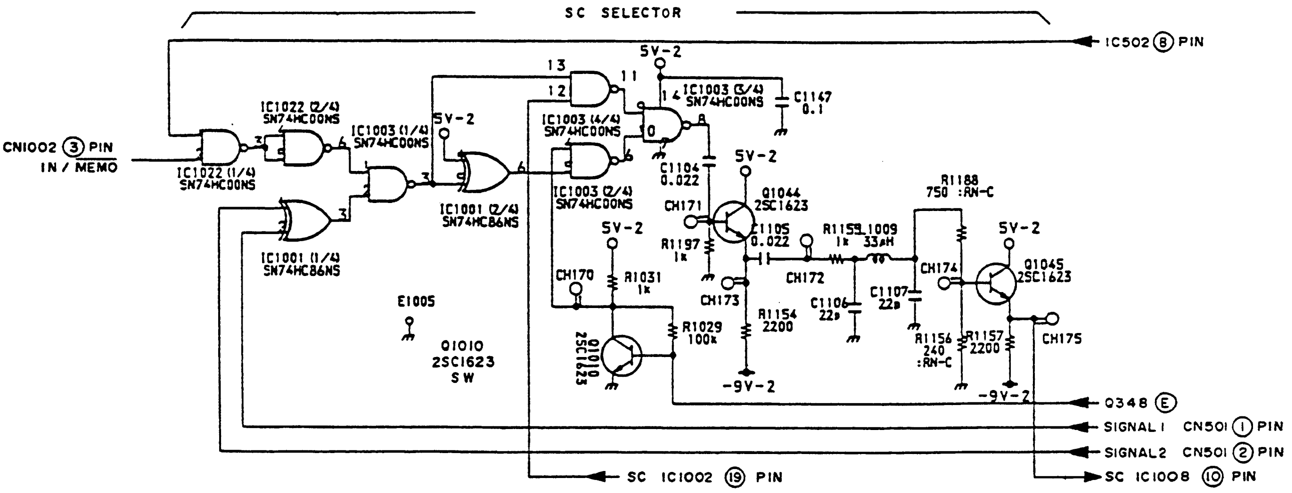
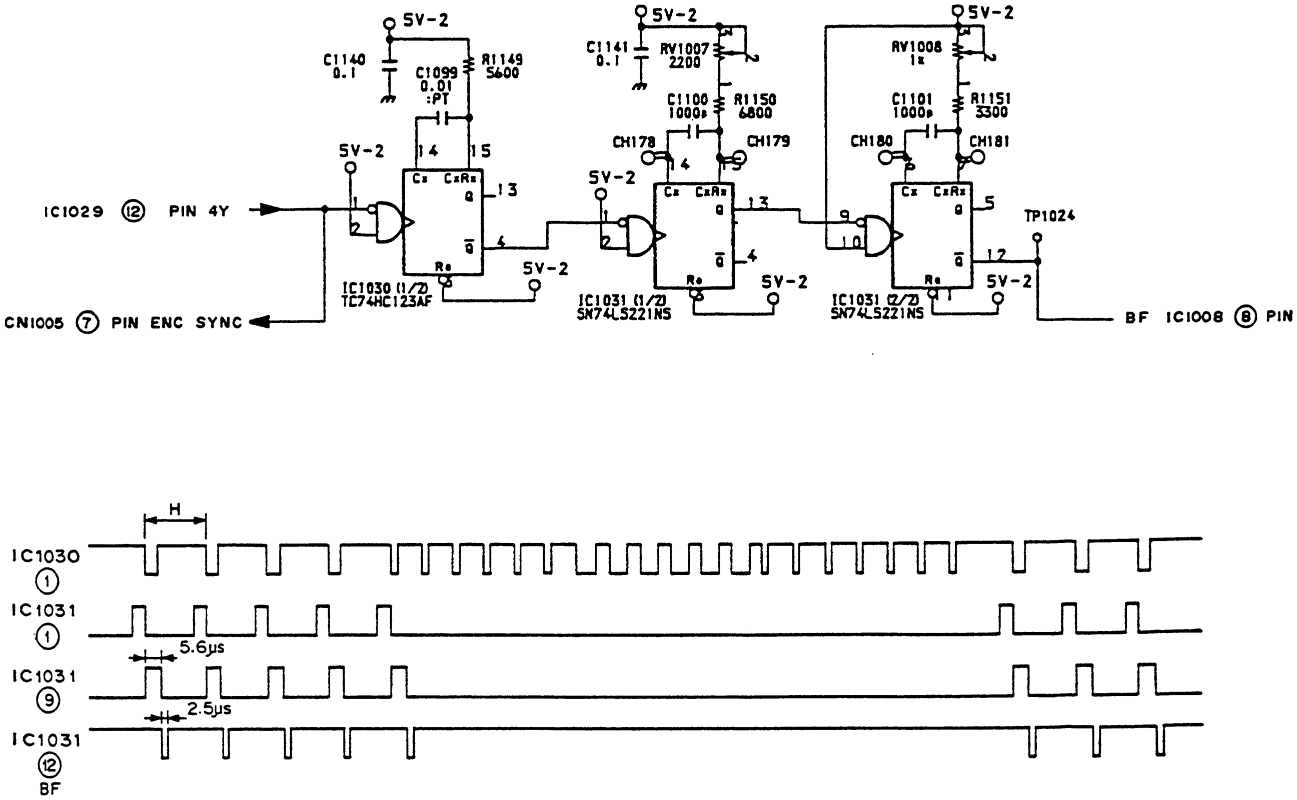

SC SELECTOR
IC502 ⑧ PIN
CN1002 ③ PIN
IN / MEMO
IC1022 (1/4) SN74HC00NS
IC1022 (2/4) SN74HC00NS
IC1003 (1/4) SN74HC00NS
IC1001 (1/4) SN74HC86NS
IC1001 (2/4) SN74HC86NS
IC1003 (2/4) SN74HC00NS
IC1003 (3/4) SN74HC00NS
IC1003 (4/4) SN74HC00NS
5V-2
-9V-2
13
12
11
14
10
8
7
6
3
1
2
4
5
C1147 0.1
C1104 0.022
C1105 0.022
C1106 22p
C1107 22p
Q1044 2SC1623
Q1045 2SC1623
Q1010 2SC1623
Q1010 2SC1623 SW
E1005
CH170
CH171
CH172
CH173
CH174
CH175
R1031 1k
R1029 100k
R1197 1k
R1154 2200
R1155 1k
L1009 33μH
R1188 750 :RN-C
R1156 240 :RN-C
R1157 2200
Q348 Ⓔ
SIGNAL1 CN501 ① PIN
SIGNAL2 CN501 ② PIN
SC IC1002 ⑲ PIN
SC IC1008 ⑩ PIN

Fig. 2-8 INT/EXT Change-Over Circuit

2-11. BF Generation Circuit

The COMPOSITE SYNC selected at IC1029 (INT/EXT change-over circuit) is output from the Pin 12 of IC1029 and is input to the Pin 1 of IC1030. IC1030 is so constructed that no pulse exists in V BLANKING due to trigger mono/multi. This output is input to the Pin 1 of IC1031. IC1031(1/2) is a mono/multi which determines the position of the BF signal.

That output is input to the Pin 9 of IC1031. IC1031(2/2) generates the BF signal from the Pin 12.



5V-2
C1140 0.1
C1099 0.01 :PT
R1149 5600
IC1029 ⑫ PIN 4Y
CN1005 ⑦ PIN ENC SYNC
IC1030 (1/2) TC74HC123AF
C1141 0.1
RV1007 2200
C1100 1000p
R1150 6800
CH178
CH179
IC1031 (1/2) SN74LS221NS
RV1008 1k
C1101 1000p
R1151 3300
CH180
CH181
IC1031 (2/2) SN74LS221NS
TP1024
BF IC1008 ⑧ PIN
Cx
CxRx
Q
Rx
H
IC1030 ①
IC1031 ①
5.6μs
IC1031 ⑨
2.5μs
IC1031 ⑫ BF

Fig. 2- 9 BF Generation Circuit

3. VIDEO SIGNAL SYSTEM (VA-26 BOARD)

3-1. General

The video signal processing system is composed of the following contents.

1) Y/C separation
2) Decoder block
3) Color difference→RGB color matrix circuit
4) Clamp circuit
5) Blanking change-over circuit
6) A/D IN AMP
7) REF generation circuit
8) R.G.B. IN AMP
9) CG circuit (character generator)
10) Encoder block
11) OUTPUT AMP

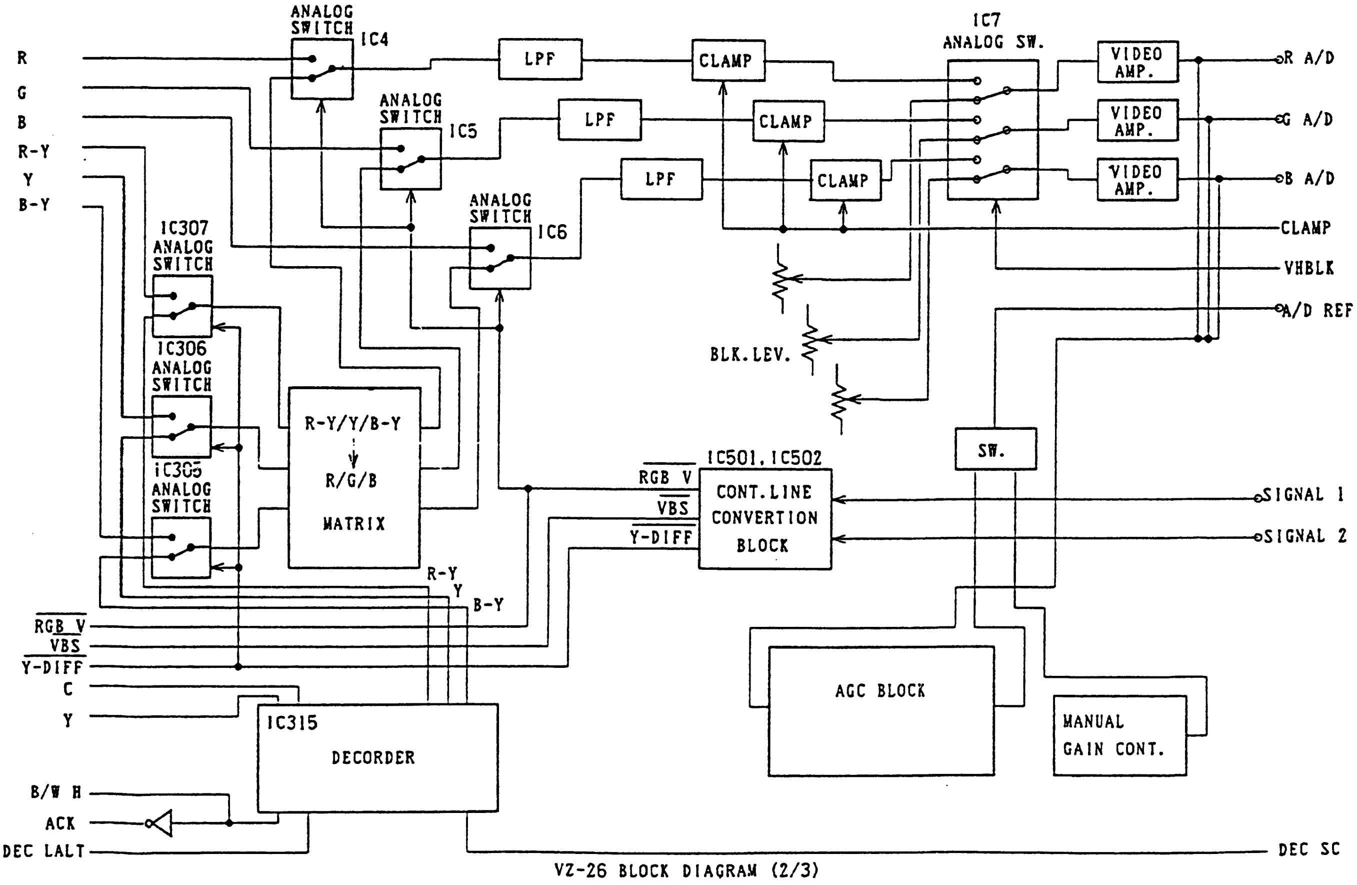
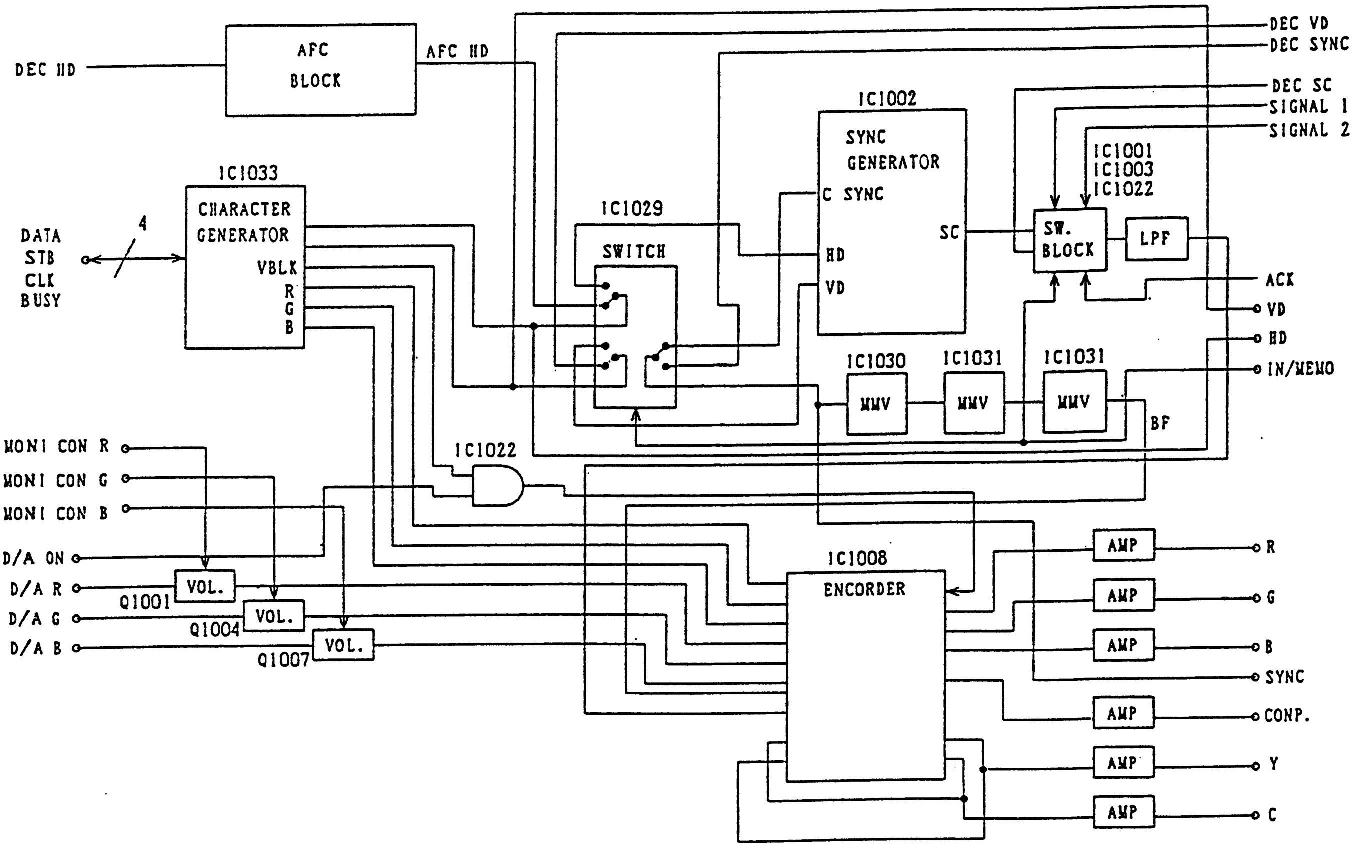

ANALOG SWITCH IC4
ANALOG SWITCH IC5
ANALOG SWITCH IC6
LPF
LPF
LPF
CLAMP
CLAMP
CLAMP
IC7 ANALOG SW.
VIDEO AMP.
VIDEO AMP.
VIDEO AMP.
R A/D
G A/D
B A/D
CLAMP
VHBLK
A/D REF
R
G
B
R-Y
Y
B-Y
IC307 ANALOG SWITCH
IC306 ANALOG SWITCH
IC305 ANALOG SWITCH
R-Y/Y/B-Y
R/G/B
MATRIX
BLK.LEV.
IC501, IC502
RGB V
VBS
Y-DIFF
CONT.LINE CONVERTION BLOCK
SW.
SIGNAL 1
SIGNAL 2
R-Y
Y
B-Y
RGB V
VBS
Y-DIFF
C
Y
IC315
DECORDER
AGC BLOCK
MANUAL GAIN CONT.
B/W H
ACK
DEC LALT
DEC SC
VZ-26 BLOCK DIAGRAM (2/3)

Fig. 3-1 VA-26 Board Block Diagram (2/3)


DEC HD
AFC
BLOCK
AFC HD
IC1033
CHARACTER
GENERATOR
VBLK
R
G
B
DATA
STB
CLK
BUSY
4
IC1029
SWITCH
IC1002
SYNC
GENERATOR
C SYNC
HD
VD
SC
DEC VD
DEC SYNC
DEC SC
SIGNAL 1
SIGNAL 2
IC1001
IC1003
IC1022
SW.
BLOCK
LPF
ACK
VD
HD
IN/MEMO
IC1030
IC1031
IC1031
MMV
MMV
MMV
BF
IC1022
MONI CON R
MONI CON G
MONI CON B
D/A ON
D/A R
D/A G
D/A B
VOL.
VOL.
VOL.
Q1001
Q1004
Q1007
IC1008
ENCORDER
AMP
AMP
AMP
AMP
AMP
AMP
R
G
B
SYNC
CONP.
Y
C

VA-26 BLOCK DIAGRAM (3/3)

Fig. 3-2 VA-26 Board Block Diagram (3/3)

3-2. Y/C Separation Circuit

The Y/C separation circuit is composed of comb filter which employs a glass delay line. The glass delay line features a piezoelectric transducer for input and input attached to a glass plate. The piezoelectric transducer changes electric signals into ultrasonic waves. Due to the transmission delay in the glass, a delay time of approximately 1H = 63.416 μsec is obtained.

The frequency characteristics are basically flat band pass characteristics in a range of 3.85 MHz ± 500 KHz. The 1H delay circuit is a phase equalizer composed of Q306, L303, C305 and R485. The filters LV310, R323, L304 and C308 are used to carry out low band phase compensation for the glass delay line.

In order to combine the amplitude of delay time between the signal that has passed the 1H delay line (DL301) and the direct signal, LV301 is used for phase adjustment and RV302 is used for amplitude adjustment.

The output of the glass delay line is applied together with the direct signal to the bridge circuits R324, R325, R326 and R327 to create a plus-minus signal.

The chroma signal is output from the Pin 2 of the 1H delay line. It passes through the TI301 bandpass filter and is sent to the Pin 2 of IC301 (analog switch). The Y signal is output from Pin 1 of the 1H delay line. The Y signal that is obtained undergoes pull-up of the high band element due to the frequency characteristics of the glass delay line. By means of the F-characteristic correction circuits L319, C336, R486 and L320, C337, R487, this section is made flat. In addition, the Y signal passes through a delay line (DL302) of approximately 340 nsec to align the Y/C Delay. The Y signal output from the DL302 is sent to the Pin 2 of IC308 (analog switch).

3-3. Decoder Block

The Y signal of the Composite Video which has undergone Y/C separation is sent to the analog switch IC308. As for the other input to IC308, the Composite Video signal output from the Pin 1 of CN302 is input to the Pin 1 via a buffer and RV. IC308 is controlled according to detection of burst/no burst by the decoder in order to carry out changing between VBS/VS signals.

The Y signal output from the Pin 15 of IC308 is sent to the Pin 2 of IC302 (analog switch). The other Y signal to IC302 is a S-Video Y signal. The Y signal that is selected according to set control is sent to the Pin 27 of the decoder IC IC315.

In the same way, regarding the chroma signal of the Composite Video which has undergone Y/C separation, the other chroma signal to IC301 which is sent to the analog switch IC301 is an S-Video chroma signal. The chroma signal that is selected according to set control is sent to the Pin 24 of the IC315 decoder IC.

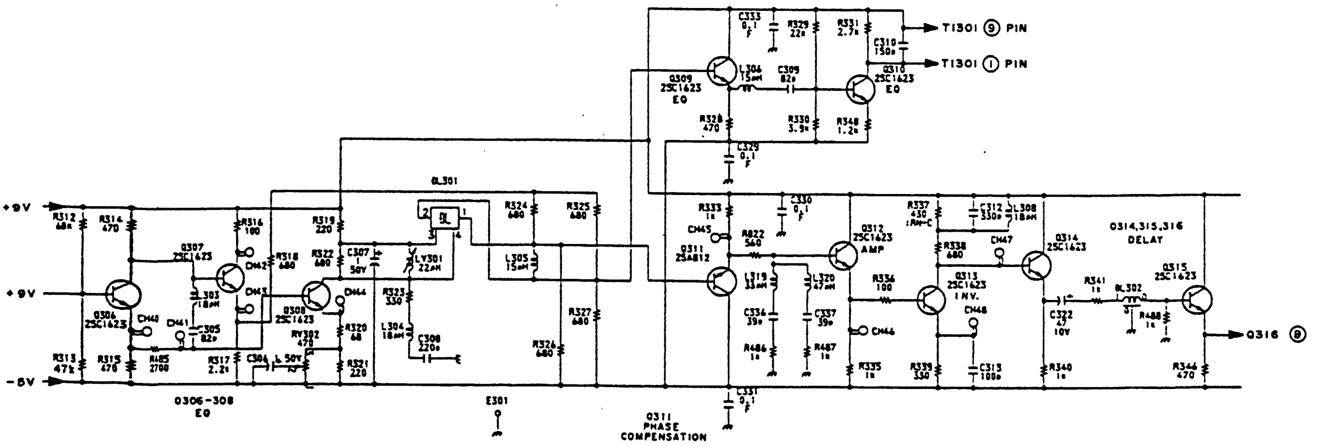


Fig. 3-3 Y/C Separation Circuit

IC315 Operational Description

1. Synchronizing separation system

Regarding the video signal that is input from the Pin 27, a synch chip is clamped to undergo synchronization and separation. The SYNC pulse created in this way is used as the basis for creating the BF, H Blanking pulses which are supplied to the individual circuits. Of these, the SYNC and the BF pulses pass through a buffer to be converted to the TTL level and are then output to the Pin 2 and the Pin 3.

2. Brightness signal reproduction system

The video signal output from the Pin 27 undergoes clamping of the pedestal and is amplified by the Y AMP.

3. ACC System

Regarding the chroma signal output from the Pin 24, the burst signal is detected by the ACC DET and there is feedback to the ACC AMP according to the detected detection output. This is controlled in such a way that the burst level is a constant value.

4. APC System

The signal whose level has been specified by the ACC AMP goes through the BURST GATE circuit where only the burst signals enter the APC circuit. Meanwhile, regarding the VXO output, carriers of 0° and 90° are created in the phase-shifting circuit.
The 90° carrier passes through the HUE circuit and enters the APC. Here there is phase comparison with the input burst and then feedback to the VXO so that the phase difference is 90° . The 0° and 90° carriers created in this way are supplied to the B-Y and R-Y DEM. As a result, by rotating the phase of the 90° carrier in the HUE circuit it is possible to change the axis of demodulation.
The SC output from the Pin 14 is sent as DEC SC to the INT/EXT SC change-over circuit.

5. Color signal reproduction system

The chroma signal amplified by the ACC AMP is then amplified by the CHROMA AMP after which it undergoes demodulation by B-Y DEM and R-Y DEM. It is then sent to the Pins 16 and 17 as a color difference signal. Since adjustment of HUE/COLOR is carried out on the front panel, a DC AMP is included with the OP AMP of IC303 so that the DC voltage is changed according to the controls as follows : HUE : Pin 10 of IC315, COLOR : Pin 23 of IC315.

6. ACK Operation

Use is made of changes in the DC voltage of the Pin 4 of the ACK time constant terminal IC315 in order to judge whether there is a burst or not. The Pin 4 of IC315 is connected to the Pin 2 of IC304 (INVERTING terminal).
the Pin 3 of IC304 (NON-INVERTING terminal) is the THRESHOLD voltage adjusted by RV317.
When a signal enters indicating a burst, the voltage of the Pin 2 of IC304 increases. When it exceeds the THRESHOLD voltage, IC304 carries out comparator operation so that the output of the Pin 1 becomes Low. When a signal enters indicating no burst, the voltage of the Pin 2 of IC304 falls so that the output of IC304 becomes High. This output becomes the control signal for changing between a VBS and VS Y signal and a VBS and VS burst signal.
The Y signal, B-Y signal and R-Y signal are output from the Pins 16, 17 and 18 of IC 315. Each signal passes through the level adjustment filter. After demodulation, the B-Y and R-Y signals are later than the Y signal. As a result, the Y signal passes a 500 nsec delay line (DL303) in order to match the times of the signals. The signals are then sent to the analog switches IC307, IC306 and IC305. Here, in accordance with the control of the unit, there is selection either of the decoder output color difference signal or the color difference signal that has been directly input to the unit.

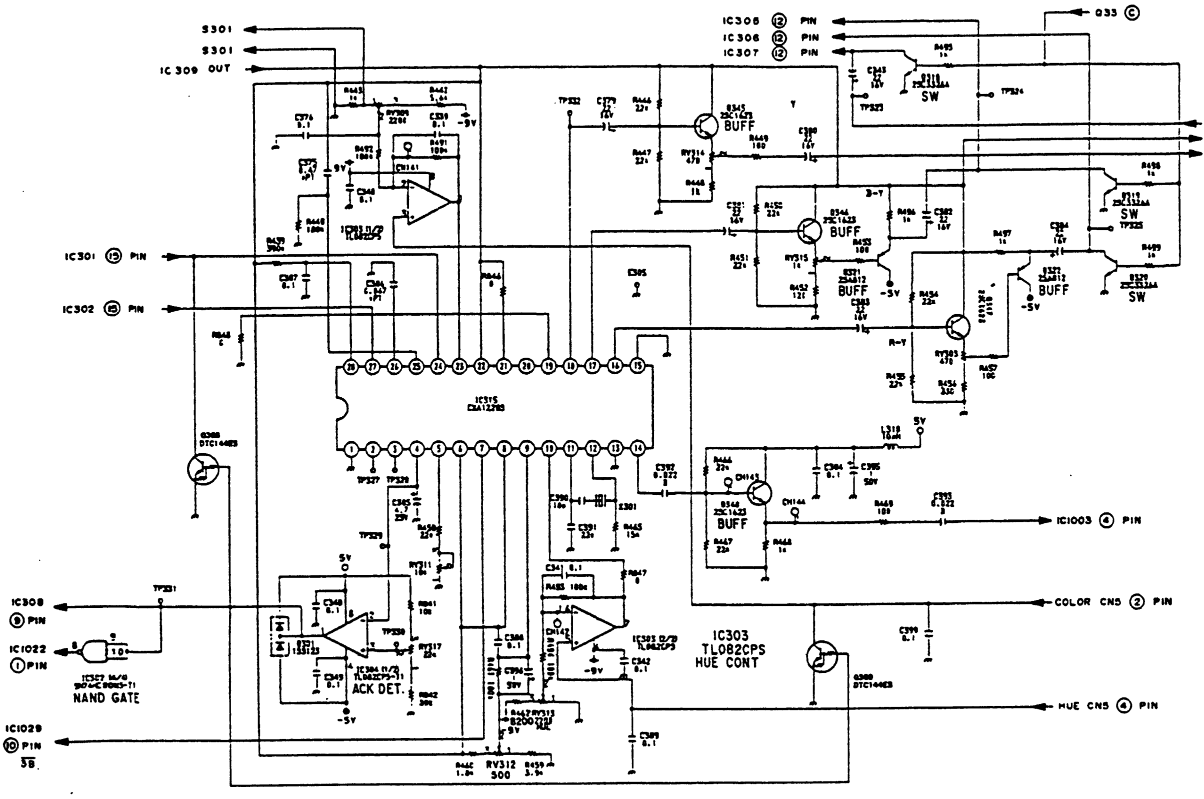

S301
S301
IC309 OUT
IC306 ⑫ PIN
IC306 ⑫ PIN
IC307 ⑫ PIN
Q33 ©
OUT IC309
Q325 ©
Q323 ⓑ
IC301 ⑮ PIN
IC302 ⑮ PIN
BUFF
SW
IC315
IC1003 ④ PIN
COLOR CN5 ② PIN
HUE CN5 ④ PIN
IC303
TL082CPS
HUE CONT
ACK DET.
NAND GATE
IC308 ⑨PIN
IC1022 ①PIN
IC1029 ⑩PIN
RV312 500

Fig. 3-4 IC315 Operational Description Circuit

3-4. Color Difference → RGB Matrix Circuit

This is the circuit for changing the analog switch OUT color difference signal to the R, G, B signals.

This is a discrete circuit composed of a matrix circuit. The matrix out R, G, B signals pass through the level adjustment circuit and are sent to the Pins 2 and 3 of the analog switches IC4, IC5 and IC6. Here, in accordance with control from the unit, either the matrix OUT R, G, B signal or the R, G, B signal directly input to the unit is selected.

3-5. Clamp Circuit

The R, G, B signals are output in the same way from the analog switch and are sent to the A/D converter of the FMY-8 Board. As a result, this explanation is limited to the G signal.

The G signal output from the Pin 15 of the analog switch IC5 is amplified approximately 1.5 times at an AMP circuit composed of Q12 and Q13 in consideration of the later attenuation of L.P.F. The amplified G signal passes through the L.P.F with a cutoff of 8.5 MHz and is generated in the synchronous processing system. Q16 goes ON as a result of the clamp pulse and the pedestal of the G signal is clamped at 0V.

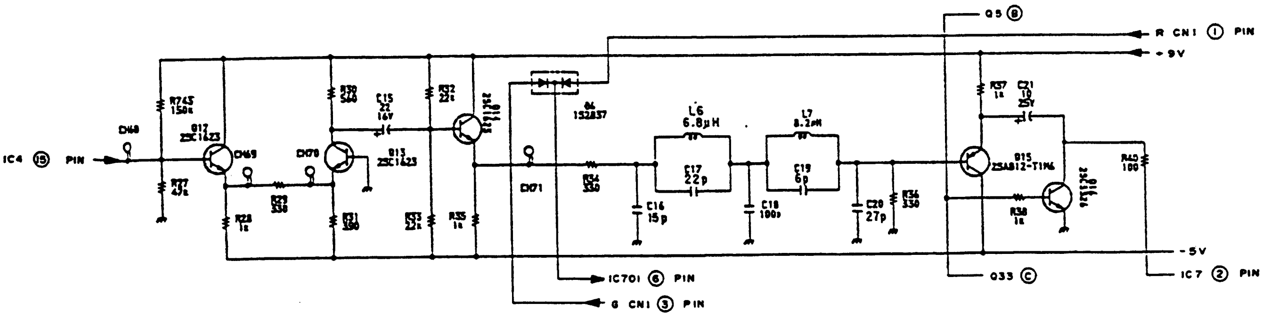

Q5 ⓑ
R CN1 ① PIN
+9V
IC4 ⑮ PIN
Q12 2SC1623
Q13 2SC1623
L6 6.8μH
L7 8.2μH
C17 22p
C19 6p
C16 15p
C20 27p
Q15 2SA812-T1H6
-5V
IC701 ⑥ PIN
G CN1 ③ PIN
Q33 ©
IC7 ② PIN

Fig. 3-5 Clamp Circuit

3-6. Blanking Alternate Circuit

Even when the COMPOSITE VIDEO, S-VIDEO color difference signal is converted into the R, G, B signals, it has a SYNC signal.Also, even with the R, G, B signals, there is a SYNC on G signal in which SYNC is added to the G signal. Before sending to the A/D circuit, it is necessary to change the SYNC section to the pedestal level (black level). Here the V. H blanking pulse created in the synchronous processing system is input to the control signal of the analog switch IC7. The blanking section is changed to the DC level adjusted with RV3.

3-7. A/D IN AMP Circuit

The A/D IN AMP is composed of a difference amplifier which amplifies approximately 10 dB. Because A/D IN is defined as 0V to standard 1.8 V, it is possible to adjust the GAIN and OFF SET. The OFF SET voltage passes through a DC AMP composed of an operation amp and is supplied to the INVERTING terminal of the A/D IN AMP at low `impedance.

3-8. REF Generation Circuit

The REF voltage of the A/D converter is supplied from the VA-26 Board.
Regarding the REF voltage, a switch on the front panel makes it possible to switch between the MANU mode and the AUTO mode. In the MANU mode, the standard is defined as 1.8 V and GAIN adjustment is carried out from the front panel. Thus, the DC AMP is composed of IC702 (2/2). Because the adjustment range can be altered approximately between 1.1 V to 2.75 V, processing is possible for signals from 61 IRE to 152 IRE.
In the AUTO mode, the level of the input signal is detected to automatically set the REF voltage. The REF voltage can be changed between 1 V and 2.6 V corresponding to 40 IRE to 140 IRE.
In addition, when the video signal is dark, the gain is increased with the AGC so that the print picture is unnaturally bright. In the case of signals with strong contrast, the shading of the bright sections disintegrates so that the grading is adversely affected.

3-9. R, G, B, IN AMP Circuit

The signals from the FMY-8 Board D/A converter are input to the connector CN1004 of the VA-26 Board at a level of approximately 1 Vp-p. In this circuit there is adjustment of the analog R, G, B GAIN for the monitor.

It is possible to adjust the Gain of the individual color signals for R, G, B in order to unify the color of the print screen and the color of the monitor screen. This adjustment is carried out by controlling the GAIN with the volume on the rear panel so that CN1003 is used to impress the DC voltage to FET transistors Q1001, 1004 and 1005. Because the circuit structure is exactly the same for the R, G, B AMP, the discussion here will be limited to the G channel. The G signal is input to FET Q1004 which is used as the variable resistance element for the input from the base grounding AMP Q1005. It is then amplified by the Q1006 buffer of the Q1005 base grounding AMP. With the AMP GAIN at approximately one time the original value and the G volume on the rear panel set to the center click position, RV1002 is adjusted so that the output level of TP1002 is 1 Vp-p.

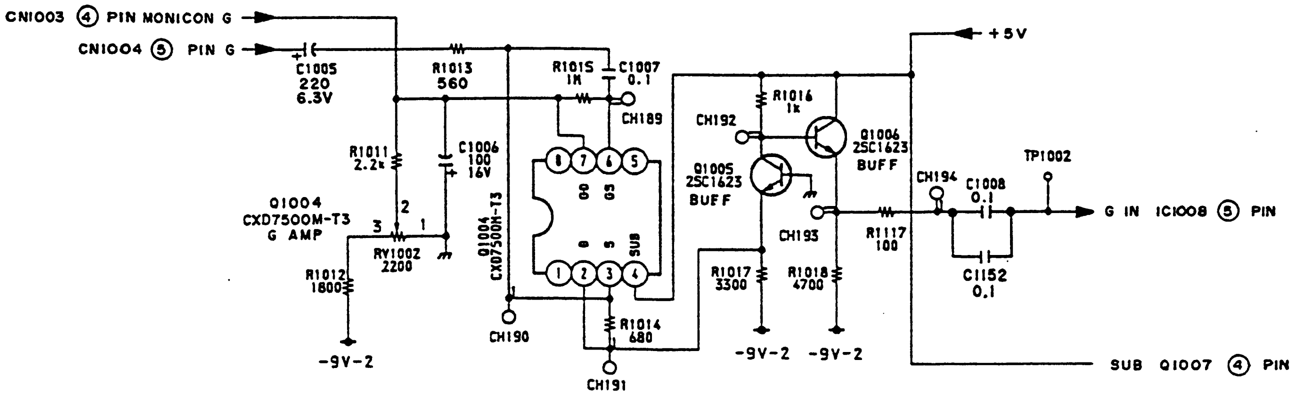

CN1003 ④ PIN MONICON G
CN1004 ⑤ PIN G
C1005
220
6.3V
R1013
560
R1015
1K
C1007
0.1
CH189
R1011
2.2k
C1006
100
16V
Q1004
CXD7500M-T3
G AMP
3
2
1
RV1002
2200
R1012
1800
-9V-2
Q1004
CXD7500M-T3
8
7
6
5
D0
G3
0
S
SUB
1
2
3
4
CH190
R1014
680
CH191
+5V
R1016
1k
CH192
Q1006
2SC1623
BUFF
Q1005
2SC1623
BUFF
CH193
R1017
3300
R1018
4700
-9V-2
-9V-2
R1117
100
CH194
C1008
0.1
TP1002
C1152
0.1
G IN IC1008 ⑤ PIN
SUB Q1007 ④ PIN

Fig. 3-6 D/A Out GAIN Adjustment Circuit

3-10. CG Circuit

IC103 is a character generator.
The HD selected by the IN/EXT switching IC1029 is input to the Pin 19 ($\overline{\text{H SYNC}}$) of IC1013 and the VD is input to the Pin 18 ($\overline{\text{V SYNC}}$). IC1013 uses an LC oscillator to oscillate a clock of approximately 6 MHz. By inputting the data from the KY-12 Board to the CN1001 connector of the VA-26 Board, the superimpose control signal is output from the blanking terminal of the Pin 15 of IC1013. Character signals are output from the R, G, B output terminals of the Pins 12, 13 and 14 of IC1013.

3-11. Encoder Block Circuit

IC1008 is an encoder IC for carrying out superimpose with the analog R, G, B signals. The superimpose circuit is composed of the internal switcher and mixer in IC1008 and a −6 dB attenuator. This is located between the clamp circuit and the output circuit. The character generator R, G, B signals input to the Pins 1, 2 and 3 of IC1008 and the video R, G, B signals input to the Pins 4, 5 and 6 form two systems. There is switching between these systems to superimpose the character signals on the monitor screen.
V Blanking signal is output from the Pin 15 of IC1013 to control the characters that are displayed on the monitor screen.
This V blanking signal is supplied to the Pin 25 of IC1008 as a switching signal YS for blanking of the image.
When the YS signal is High, the R, G, B signals are switched over momentarily from the video side to the character side so that characters are displayed on the monitor.
Also, when characters are displayed, except in special cases (basic display screen, COLOR AD), there is halftone control from the SY-9 Board so that the input to the Pin 7 of CN501 of the VA-26 Board becomes High which makes the Pin 27 YM signal of IC1008 also High. As a result, IC1008 makes a halftone (−6 dB) of the superimposed video screen so that the character display is more legible.
At the encoder circuit, an R signal, G signal and B signal are output from the Pins 21, 22 and 23 of IC1008. These signals are then encoded to output a Composite Video signal. The Composite Video signal is output from the Pin 19.
The demodulating chroma signal C is output from the Pin 13 of IC1008 and undergoes band restriction with the 3.58 MHz bandpass filter FL1001. It is then returned to the Pin 16 for mixing with the Y signal.
Also, in order to match the phase of the brightness signal Y and the chroma signal, the brightness signal Y output from the Pin 14 of IC1008 is delayed by the 180 nsec delay line DL1001, undergoes level adjustment at RV1004 and is returned to the Pin 17. The chroma signal which has been returned to the Pin 16 and the Y signal of DL1001 OUT are used to output the S Video Signal.
For the sub-carrier signal for encoder use, there is input to the Pin 10 of the SC signal described in the synchronous processing system INT/EXT switching circuit.
For the burst flag, the burst flag described in the BF generation circuit of the synchronizing processing system is input to the Pin 8.
For the Composite Sync Signal, the Composite Sync signal described in the synchronizing processing system INT/EXT switching circuit is input to the Pin 11.

3-12. OUTPUT AMP Circuit

The R signal G signal, B signal, Composite Video signal, S-Video C signal and Y signal are adjusted to the appropriate level in the two amps. The R, G, B signals are sent to the IF-19 Board from CN1005, the Composite Video signal from CN1006, the S-Video signal from CN1007.

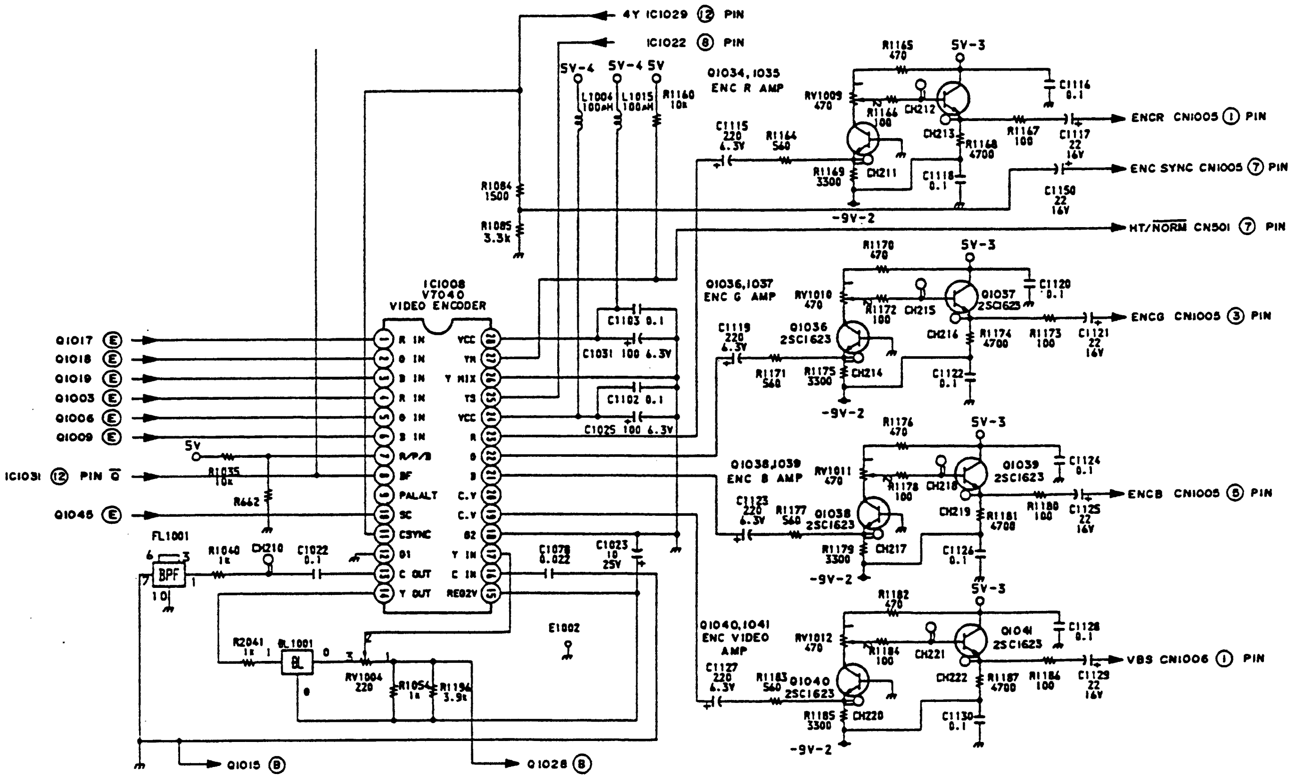

4Y IC1029 ⑫ PIN
IC1022 ⑧ PIN
5V-4
5V-4
5V
L1004 100μH
L1015 100μH
R1160 10k
R1084 1500
R1085 3.3k
IC1008
V7040
VIDEO ENCODER
Q1017 Ⓔ
Q1018 Ⓔ
Q1019 Ⓔ
Q1003 Ⓔ
Q1006 Ⓔ
Q1009 Ⓔ
5V
R1035 10k
IC1031 ⑫ PIN Q̄
R662
Q1045 Ⓔ
R IN
G IN
B IN
R IN
G IN
B IN
R/P/B
BF
PALALT
SC
CSYNC
G1
C OUT
Y OUT
VCC
YM
Y MIX
YS
VCC
R
G
B
C.V
C.V
G2
Y IN
C IN
REG2V
C1103 0.1
C1031 100 6.3V
C1102 0.1
C1025 100 6.3V
FL1001
BPF
R1040 1k
CH210
C1022 0.1
C1078 0.022
C1023 10 25V
E1002
R2041 1k
BL1001
BL
RV1004 220
R1054 1k
R1194 3.9k
Q1015 Ⓑ
Q1028 Ⓑ
Q1034, 1035
ENC R AMP
R1165 470
5V-3
RV1009 470
R1166 100
CH212
C1116 0.1
C1115 220 6.3V
R1164 560
CH213
R1168 4700
R1167 100
C1117 22 16V
ENCR CN1005 ① PIN
R1169 3300
CH211
C1118 0.1
C1150 22 16V
ENC SYNC CN1005 ⑦ PIN
-9V-2
HT/NORM CN501 ⑦ PIN
Q1036,1037
ENC G AMP
R1170 470
5V-3
RV1010 470
R1172 100
CH215
Q1037 2SC1623
C1120 0.1
C1119 220 6.3V
Q1036 2SC1623
CH216
R1174 4700
R1173 100
C1121 22 16V
ENCG CN1005 ③ PIN
R1171 560
R1175 3300
CH214
C1122 0.1
-9V-2
Q1038,1039
ENC B AMP
R1176 470
5V-3
RV1011 470
R1178 100
CH218
Q1039 2SC1623
C1124 0.1
ENCB CN1005 ⑤ PIN
C1123 220 6.3V
R1177 560
Q1038 2SC1623
CH219
R1181 4700
R1180 100
C1125 22 16V
R1179 3300
CH217
C1126 0.1
-9V-2
Q1040,1041
ENC VIDEO AMP
R1182 470
5V-3
RV1012 470
R1184 100
CH221
Q1041 2SC1623
C1128 0.1
VBS CN1006 ① PIN
C1127 220 6.3V
R1183 560
Q1040 2SC1623
CH222
R1187 4700
R1186 100
C1129 22 16V
R1185 3300
CH220
C1130 0.1
-9V-2

Fig. 3-7 Encoder Circuit

4. DIGITAL VIDEO SYSTEM (FMY-8 BOARD)

4-1. General

The FMY-8 Board is the circuit for taking video signals to the printer and storing in the memory. It is composed as shown in the block diagram below.

1) A/D Block
2) D/A Block
3) DRAM Block
4) SRAM Block
5) MMU Block
6) SELECT MASKING Block
7) SYNC Block

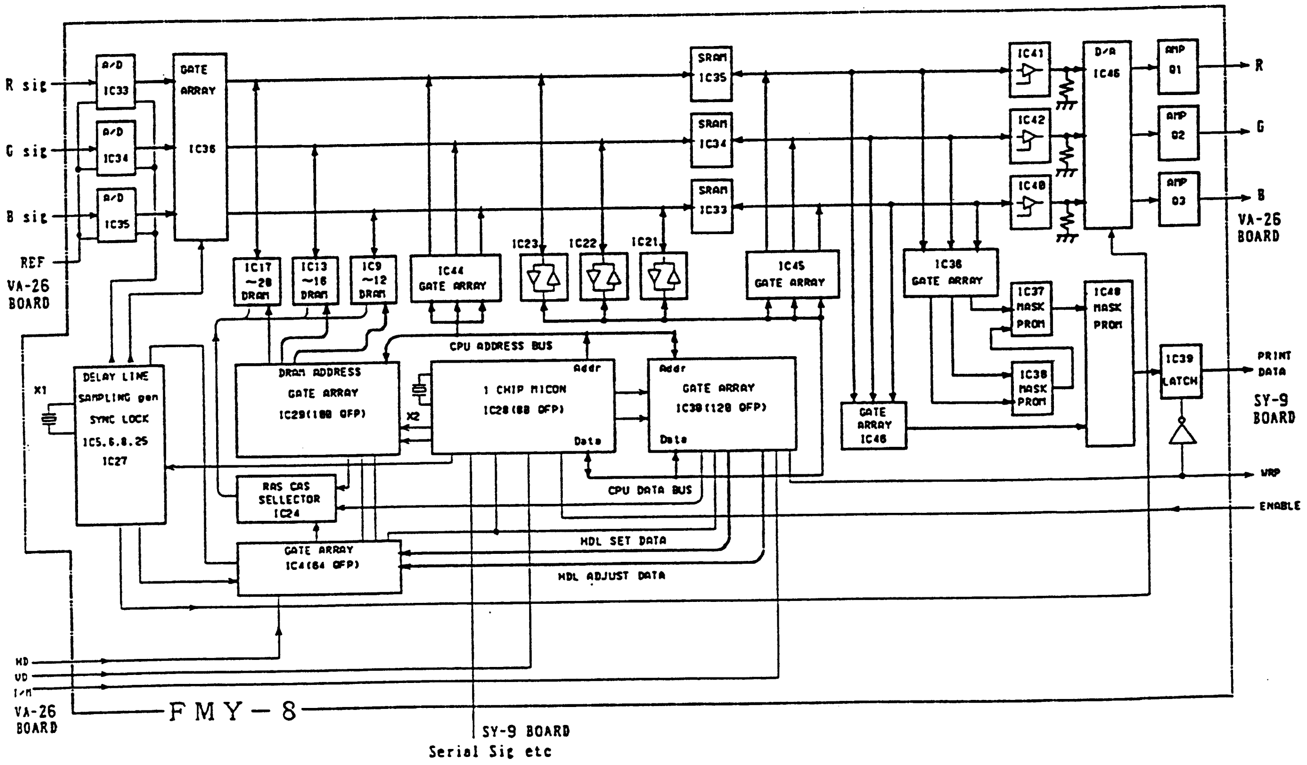

R sig
G sig
B sig
REF
VA-26 BOARD
A/D IC33
A/D IC34
A/D IC35
GATE ARRAY IC36
IC17 ~20 DRAM
IC13 ~16 DRAM
IC9 ~12 DRAM
IC44 GATE ARRAY
IC23
IC22
IC21
SRAM IC35
SRAM IC34
SRAM IC33
IC45 GATE ARRAY
IC36 GATE ARRAY
IC41
IC42
IC40
D/A IC46
AMP Q1
AMP Q2
AMP Q3
R
G
B
VA-26 BOARD
IC37 MASK PROM
IC38 MASK PROM
IC48 MASK PROM
GATE ARRAY IC46
IC39 LATCH
PRINT DATA
SY-9 BOARD
WRP
ENABLE
CPU ADDRESS BUS
X1
DELAY LINE SAMPLING gen SYNC LOCK IC5,6,8,25 IC27
DRAM ADDRESS GATE ARRAY IC29(100 QFP)
X2
1 CHIP MICON IC28(80 QFP)
Addr
Data
Addr
GATE ARRAY IC30(120 QFP)
Data
CPU DATA BUS
RAS CAS SELLECTOR IC24
GATE ARRAY IC4(64 QFP)
HDL SET DATA
HDL ADJUST DATA
HD
VD
I/n
VA-26 BOARD
FMY-8
SY-9 BOARD
Serial Sig etc

Fig. 4-1 FMY-8 Board Block Diagram

4-2. A/D Block

Figure 4-2 shows the circuits comprising the A/D Block.

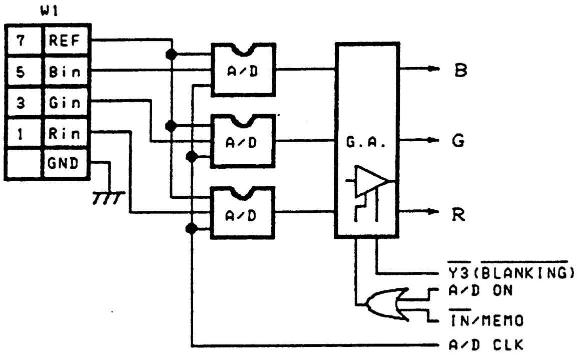


Fig. 4-2 A/D Block Circuit

The main structural elements are three A/D converters (CXD1175AM × 3) and three state buffers (1 gate array).

In this Board, the analog R, G, B signals from the VA-26 Board are converted into digital 8-bit signals.

In the black level, analog is GND level and digital is hexadecimal 00H.

At the white level, there is V Ref voltage supplied from the VA-26 Board so that digital is hexadecimal FFH.

(In the UP-5000 the white level is supplied with minus voltage. In the same way, the V Ref voltage was minus.)

In the UP-5100/5200 MD series, the white level is supplied with plus voltage. For your reference, one example of analog input level is shown in Table 4-1 where the AGC of the input signal is in the center of Manual (*).

(* : Open the ribbon door on the front of the set and set the AUTO/MANUAL switch to MANUAL. Then turn the MANUAL volume to the center.)

Signal input during MANUAL gain		VRef input during MANUAL gain (gain level is center)
White level voltage	Black level voltage	
1.8 V	GND	1.8 V

Table. 4-1

During MANUAL gain where the gain is at the center, the VA-26 Board adjustment is off when the values in table 4-1 are not obtained.

As for the sampling clock, a 14.31818 MHz clock compiled in the SYNC circuit block (locked to H) is matched to the correct phase in the delay line and then input (in order to match the timing with the D/A and the timing with the DRAM).

The control signals of this block include the RAS · CAS signal system of the DRAM and an enable signal (OE) that outputs and controls the digital data. Due to the impedance of the later blocks, the A/D output uses a gate array (3ch 3-state buffer). The enable signal is input to the output control terminal of this gate array. The enable period is within the usual picture area period at the time the external output is selected. When the image stored in the memory undergoes monitor out or when there is blanking, the $\overline{OE}$ signal goes to H level and there is no output of data.

4-3. D/A Block

Figure 4-3 shows the circuits comprising the D/A Block.

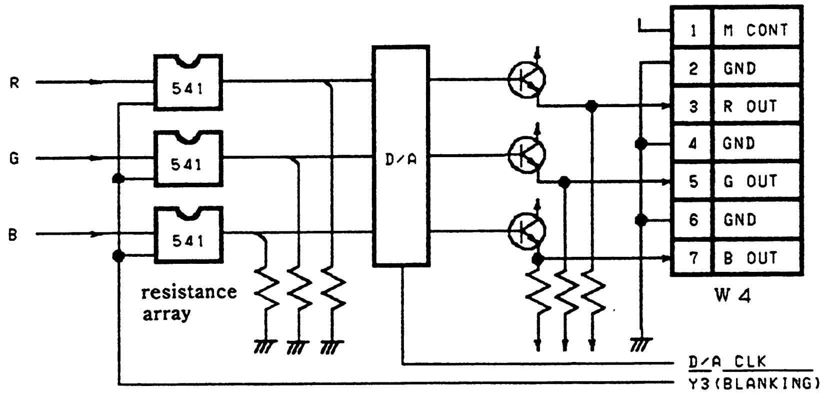


Fig. 4-3 D/A Block Circuit

The main structural elements are an IC consisting of a combination of 3 channels of D/A converters (CXA1260Q-Z), three 3-state buffers (HC541) and three pull-down resistance arrays. In this block the digital 8-bit R, G, B signals are converted to analog signals and sent to the VA-26 Board.
The analog output level of the D/A converter is shown in table 4-2.

white level voltage	black level voltage	(black level—white level) voltage
approx. 5V	approx. 4V	approx. 1V

Table. 4-2

As for the D/A conversion clock, a 14.31818 MHz clock compiled in the SYNC circuit block (locked to H but with a different phase as the A/D conversion clock) is matched to the appropriate phase in the delay line and then input.
With the R, G, B signal, the system is black level during the SYNC period.
As a result, the video signal undergoes full swing at 256 gradations on an 8-bit digital signal bus.
The control signal of this block requires a signal to make the image signal level to be black level during blanking. A signal $\overline{Y3}$ is used that shows the usual picture area period. When $\overline{Y3}$ becomes H level, the output from HC541 is in high impedance state. As a result, it goes to black level due to the following pull-down array.

4-4. DRAM Block

This block is composed of 12 1M DRAM's (UP-5100/5200MD) or 12 2M DRAM's (UP-5150/5250MD) and 1 data selector (F257), 1 OR (HC32), and 3 bi-directional buffers (F245).

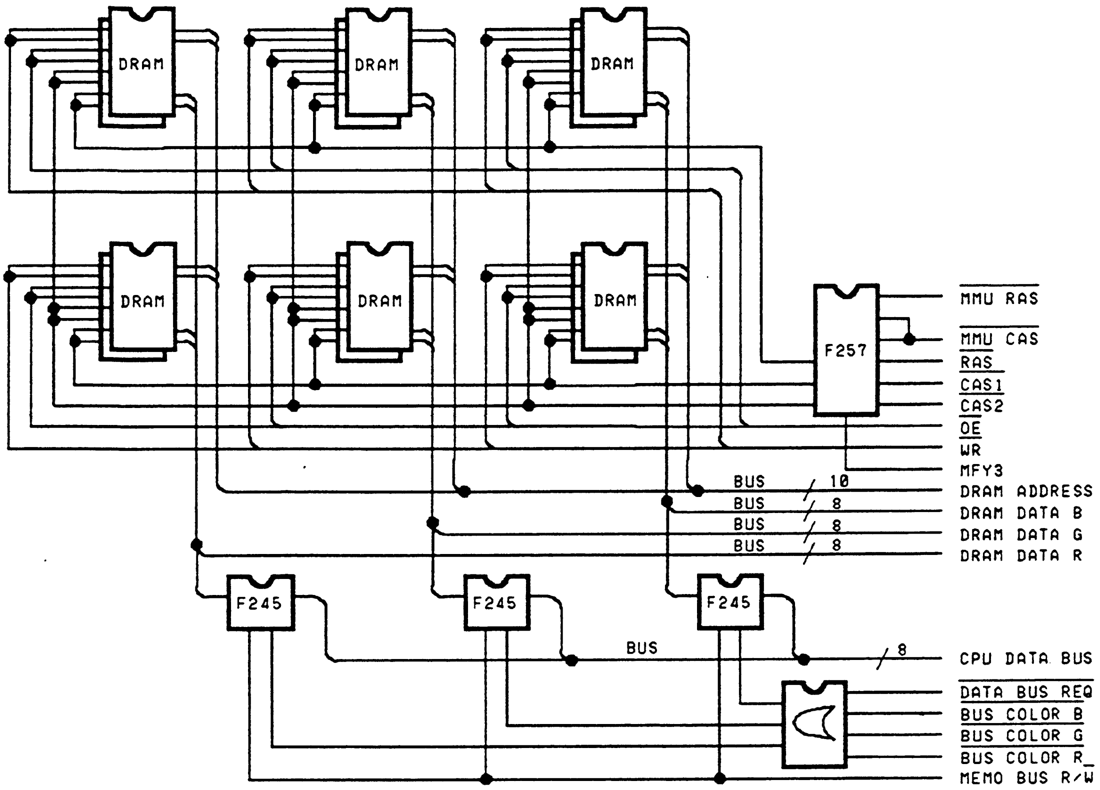

DRAM
DRAM
DRAM
DRAM
DRAM
DRAM
F257
MMU RAS
MMU CAS
RAS
CAS1
CAS2
OE
WR
MFY3
BUS
10
DRAM ADDRESS
BUS
8
DRAM DATA B
BUS
8
DRAM DATA G
BUS
8
DRAM DATA R
F245
F245
F245
BUS
8
CPU DATA BUS
DATA BUS REQ
BUS COLOR B
BUS COLOR G
BUS COLOR R
MEMO BUS R/W

Fig. 4-4 DRAM Block Circuit

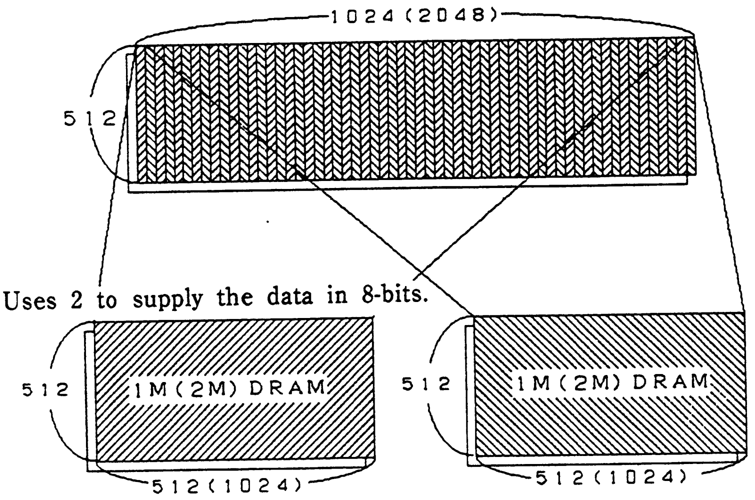
4-4-1. Memory Space

The 1M DRAM is mounted on a single-frame memory standard mechanism. Regarding one DRAM, there is a 256 K bit address space where the RAS address is 0 to 511 and the CAS address is 0 to 511. Corresponding to this is 4 bits of data (1 M bit space).

The 2M DRAM is mounted on a double-frame memory standard mechanism. Regarding one DRAM, there is a 512 K bit address space where the RAS address is 512 to 1023 and the CAS address is 0 to 1023. Corresponding to this is 4 bits of data (2 M bit space).

Regarding the 12 DRAM's, there are four each for the RGB channels. They are arranged as shown in Figure 4-5. The 1M and 2M DRAM's are interlaced in the CAS direction.

Interlacing dot by dot in the CAS direction.



Uses 2 to supply the data in 8-bits.

Items in parentheses indicate models which include a 2 FRAME memory.

Fig. 4-5 Structural Diagram of the Image Memory for Each Color

4-4-2. Interlace

The reason interlace is used is to be able to make use of the circuit (gate array) even when the DRAM access time is delayed. Thus, in response to 4 fsc sampling there is sampling at 2 fsc for a single DRAM.

This in turns creates leeway in the timing margins for the individual control signals (exRAS, CAS, etc.).

The DRAM control signals include the $\overline{\text{RAS}}$ · $\overline{\text{CAS}}$ signal and the $\overline{\text{WR}}$ · $\overline{\text{OE}}$ signal.

DRAM access can be roughly divided into the mode in which the MMU block controls the DRAM and the other modes.

These are also the blanking mode and the usual picture area mode. The mode where the MMU block controls the DRAM is the blanking period. That means that modes other than this are the usual picture area period.

4-4-3. Blanking

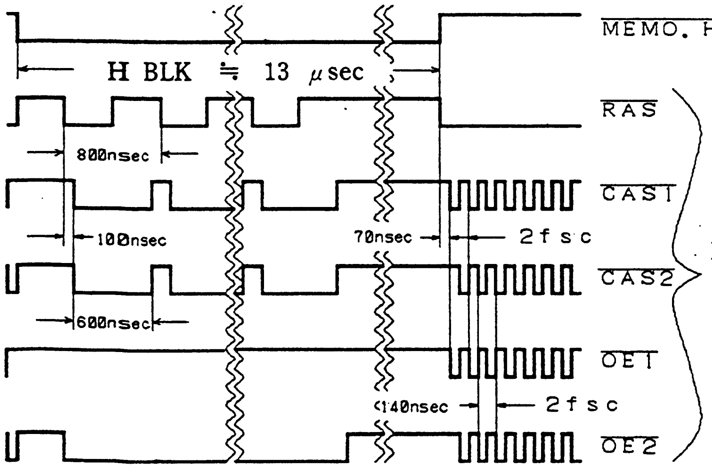
The blanking period includes the H blanking (H BLK) period and the V Blanking (V BLK) period. The V blanking period is the time during which only the MMU block can directly access the DRAM. The H Blanking period is assigned to the time where the MMU block carries out DMA period For example, captions and test patterns are written to the DRAM during the V blanking period and the $\overline{\text{DAT BUS REQ}}$ signal is low, and the DRAM data bus and CPU data bus are directly connected. Also, the DRAM control signal and the MFY3 signal change the data selector so that the $\overline{\text{RAS}}$ · $\overline{\text{CAS}}$ signal is supplied from the MMU block. In addition, when carrying out DRAM refresh or when transmitting print data, this is H blanking period. In the same way the MFY3 signal changes the data selector so that the $\overline{\text{RAS}}$ · $\overline{\text{CAS}}$ signal is sent from the MMU block.

During the usual picture area period the MMU block cannot control the DRAM. The DRAM control block synchronizes with the sampling block to carry out DRAM access. Refer to the descriptions for the following blocks for a description of these matters.

4-4-4. Phase Timing

Figure 4-6 shows the phase timing of RAS · CAS, etc. during monitor out of the image included in the frame memory.

During monitor out of the input signal, there are no waveforms of RAS · CAS in the H usual picture area.



Differs when viewing the input video signal on the monitor.

Fig. 4-6 Timing of the DRAM Control Signal

4-5. SRAM Block

Figure 4-7 shows the circuit composed of the SRAM block.
The main composite elements are three 2 K bit high-speed SRAM's, two 3-state buffers (2 gate arrays) and a 2 → 4 decoder (F139).

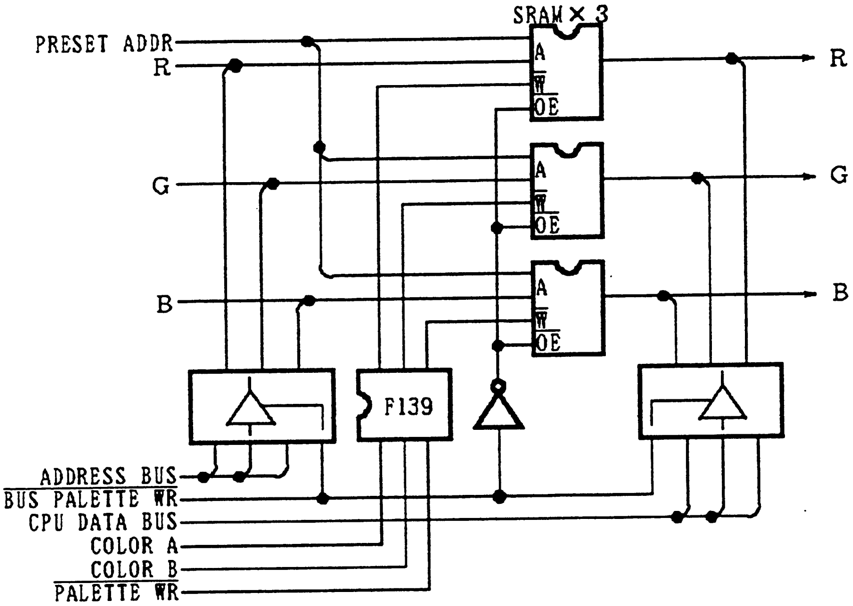

SRAM × 3
PRESET ADDR
R
G
B
A
W
OE
F139
R
G
B
ADDRESS BUS
BUS PALETTE WR
CPU DATA BUS
COLOR A
COLOR B
PALETTE WR

Fig. 4-7 SRAM Block

A video signal that has been output from the VA-26 Board and undergone digitization (A/D conversion) or a video signal that has already been stored in the DRAM (frame memory) has its amp gain changed to adjust the color balance of the video signal.
In this block, which is also known as the color palette block, in response to input (address side) to the SRAM a computational result in which a certain numerical constant is multiplied is written from the CPU (inside the MMU block). This value is output (data side) and sent to the D/A block and the print circuit (goes to SY-9 board via the masking circuit)The 2 gate arrays, decoders, etc. do not operate other when writing to the SRAM the computational results from the CPU (high impedance state).
When the COLOR-ADJUST function is selected to change the color balance, the BUS PALETTE WR signal and PALETTE WR signal are output from the MMU block during the V blanking period and the new palette data is written to the SRAM. At this time, the 2 gate arrays are allowed output by the BUS PALETTE WR signal so that the addresses and data can be sent from the MMU block to the SRAM.
Figure 4-8 shows the timing chart when the CPU sends data to the SRAM.

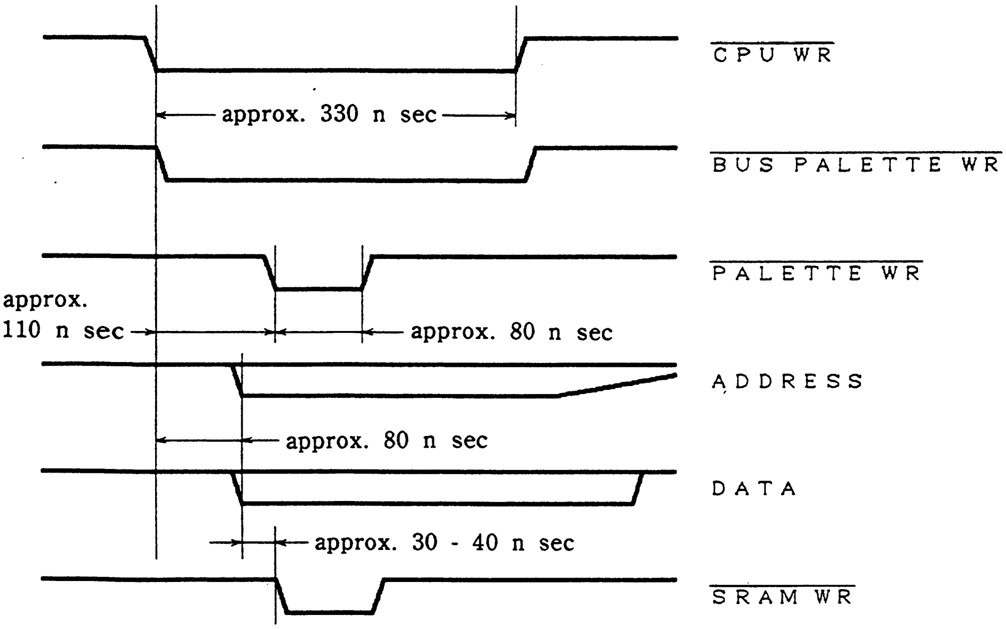


Fig. 4-8 Timing When Writing Data to the SRAM

4-6. MMU Block

Figure 4-9 MMU Block Equivalent Circuit.
The structure is simple, consisting only of two IC's One IC is a single chip microcomputer (hereafter known as CPU). This permits many of the functions of the software (program).
This block carries out the role of a controller for the FMY-8 Board, controls the frame memory (DRAM) and controls the Sync system. The following is a description of those three roles.

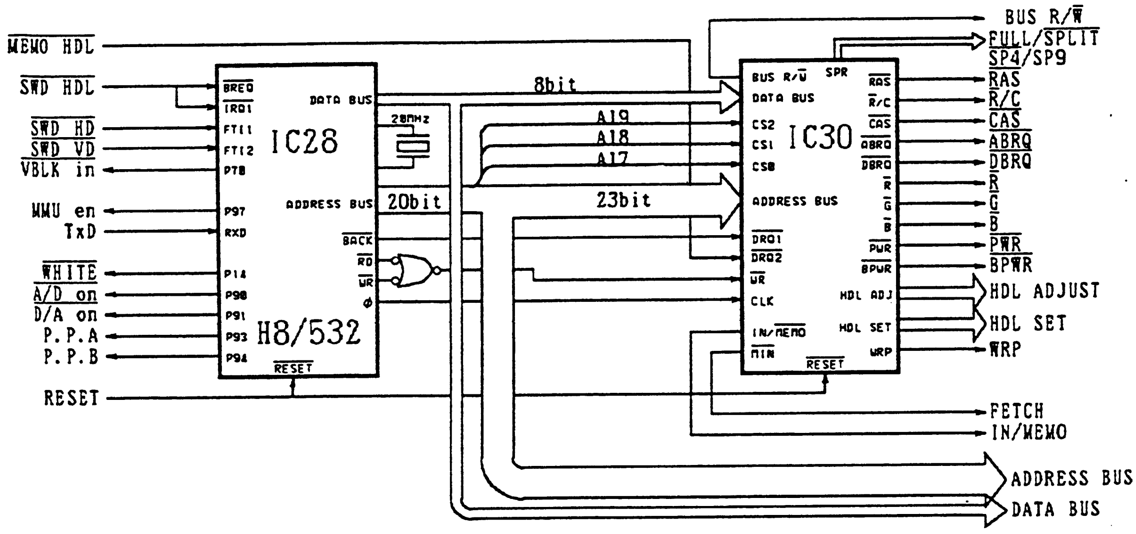

MEMO HDL
SWD HDL
SWD HD
SWD VD
VBLK in
MMU en
TxD
WHITE
A/D on
D/A on
P.P.A
P.P.B
RESET
BREQ
IRQ1
FTI1
FTI2
P78
P97
RXD
P14
P98
P91
P93
P94
IC28
H8/532
DATA BUS
ADDRESS BUS
BACK
RD
WR
φ
RESET
28MHz
8bit
20bit
A19
A18
A17
23bit
BUS R/W
SPR
DATA BUS
CS2
CS1
CS0
IC30
ADDRESS BUS
DRQ1
DRQ2
WR
CLK
IN/MEMO
MIN
RESET
RAS
R/C
CAS
ABRQ
DBRQ
R
G
B
PWR
BPWR
HDL ADJ
HDL SET
WRP
BUS R/W
FULL/SPLIT
SP4/SP9
RAS
R/C
CAS
ABRQ
DBRQ
R
G
B
PWR
BPWR
HDL ADJUST
HDL SET
WRP
FETCH
IN/MEMO
ADDRESS BUS
DATA BUS

Fig. 4-9 MMU Block

4-6-1. Role as controller

The board controlling the set is the SY-9 Board. The commands from here to the FMY-8 Board are transmitted to the CPU by serial communications.
The communications format is as follows, baud rate 4800 bps/data 8 bit/stop bit 2/parity no-parity. This communications is mono-directional communications from the SY-9 Board to the FMY-8 Board (the TP terminal name is TXD and the CPU terminal name is RXD). It carries out a simple handshake (MMU ENABLE) to limit communications. The reason for the handshake is as follows First of all, in order for the CPU to interpret and execute the command data that has been sent there is only enough time during V Blanking. Also, because there is only a buffer to store the sent command data to the memory, if the data is sent continuously, different commands can overlap so that data is lost.
When the CPU is ready to receive commands from the SY-9 Board, the MMU ENABLE signal is sent in several μsec after a basically fixed period following fall of the SWD VD signal.
This signal is received by the SY-9 Board and, when there is data to be sent, the command data is sent immediately after this one command at a time. (Please refer to figure 4-10.)

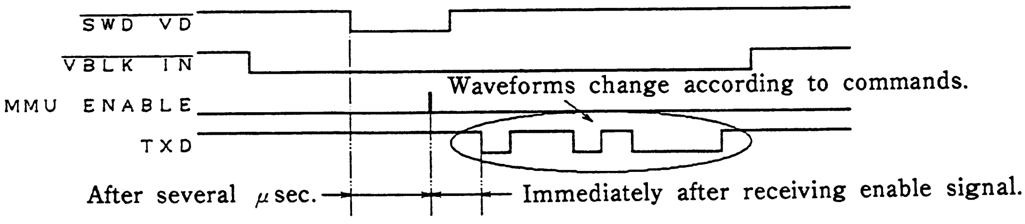

SWD VD
VBLK IN
MMU ENABLE
TXD
Waveforms change according to commands.
After several μsec.
Immediately after receiving enable signal.

Fig. 4-10 Timing Chart for Serial Communications

The command which has been sent is executed by the CPU at the next V-Blanking.
More accurately speaking, it starts execution at a timing roughly when an MMU ENABLE signal is output following a set period after fall of the $\overline{\text{SWD VD}}$ signal.
The execution time can be roughly divided into two types. Simple commands are completed during blanking and the MMU ENABLE signal is immediately returned. For commands that require more time such as storing video signals in the memory or when changing the color palette (color adjust), this is done with multiple V-Blanking.
In such a case, the MMU ENABLE signal is not returned until the commands have been executed.

4-6-2. Control of the Frame Memory (DRAM)

Among blocks controlling the DRAM in addition to this block there is the DRAM control block.
In this machine's frame memory system the CPU speed is insufficient to control the DRAM so that hard control is required. Receipt of high-speed hard commands is done with the DRAM control block. The MMU block can be considered as controlling this block.
As was explained on page 4-4, the operation of the DRAM can be divided into two phases, blanking period and usual picture area period.
The MMU block can directly control the DRAM during the blanking period.
The DRAM data bus becomes valid on the MMU side and the RAS.CAS addresses are changed to addresses from the MMU. Conversely, during the usual picture area period these buses, etc. are removed from the MMU so that the DRAM control block is controlling.
The blanking period can be further divided into two phases, the V blanking period and the H blanking period. (Please refer to table.4-3)

Period Block	DRAM Control Block	MMU Block
V-Blanking	Not operating (see Note)	Writing of captions
H-Blanking	Not operating (see Note)	Refresh / Data transmission
usual picture area	Read / Write	No DRAM access
Note : Change the address which is output MMU block for RAS/CAS address.		

Table. 4-3

Next the V blanking and H blanking periods during MMU operation will be explained.

•MMU operating during the V blanking period

During the V Blanking period, the CPU can write captions to the DRAM (function for writing comments, etc. in the spare area during printing).

The frame memory (DRAM group) is located in the address space on the CPU bus. Simultaneous with accessing the memory with this address, an RAS • CAS control signal synchronized with this is used to write the designated characters in the designated position. (The frame memory address space is a 23 bit space in a 2-frame memory. However, because the CPU address bus is only 20 bits, an address page function is effected in the IC30 gate array to expand to 23 bits. Also, the RAS/CAS control signal is synchronized with data output from the CPU and output from IC30.)

Figure 4-11 shows the timing when writing data from the CPU to the DRAM. The R/C signal is used so that the addresses that are output when the CPU accesses the frame memory undergo time division inside IC29 to the RAS address and CAS address which are the DRAM addresses.

During "H" level the lower 10 bits of the CPU address become the RAS address. During "L" level the middle address 10 bits of the CPU address (and a composite of IC30) are the CAS address for supply from IC29 to the DRAM.

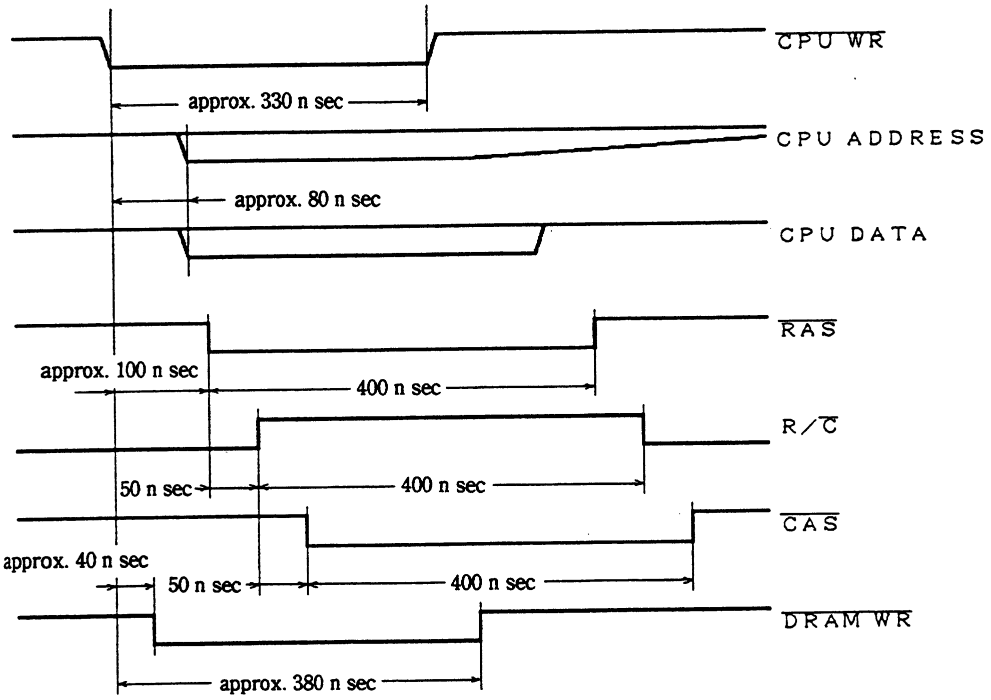

$\overline{\text{CPU WR}}$
approx. 330 n sec
CPU ADDRESS
approx. 80 n sec
CPU DATA
$\overline{\text{RAS}}$
approx. 100 n sec
400 n sec
$R/\overline{C}$
50 n sec
400 n sec
$\overline{\text{CAS}}$
approx. 40 n sec
50 n sec
400 n sec
$\overline{\text{DRAM WR}}$
approx. 380 n sec

Fig. 4-11 Timing for writing character data from the CPU to the DRAM

• MMU operation during H blanking

During the H Blanking period (but not including the V Blanking period) the CPU releases a bus and stops its function as CPU. When the bus is released a BACK signal is output from the CPU so that IC30 (gate array) occupies the bus instead of the CPU. The gate array is programmed from the CPU during the usual picture area period of H and executes the contents that have been programmed at the time the bus is occupied. Execution of the programmed contents include DRAM refresh and data transfer (DMA) to the print circuits, initial setting of addresses for the high-speed page mode operation of the DRAM. These are functions so that processing is in time with the CPU speed.

For data transfer, print data is transferred from the DRAM via the SRAM and MASKING blocks to the head controller of the SY-9 Board.

The gate array outputs during H Blanking a maximum of 8 addresses of frame memory addresses (23 bits) of the printing position. There is then output of a maximum of 8 forms of data from the memory. Although the refresh operation is basically the same as data transfer, it differs in that the transfer clock synchronized with the data is not output from the gate array. The transfer clock is described in the section on the Masking Block. For the initial setting of the address corresponding to the DRAM high-speed page mode, immediately after outputting a maximum of 8 addresses consisting either of refresh address or data transfer address, the high-speed page mode state address is output and is maintained until the MEMO HDL signal goes to "H".

The high-speed page mode is described in the section on the DRAM control block. Figure 4-12 shows the timing for this process.

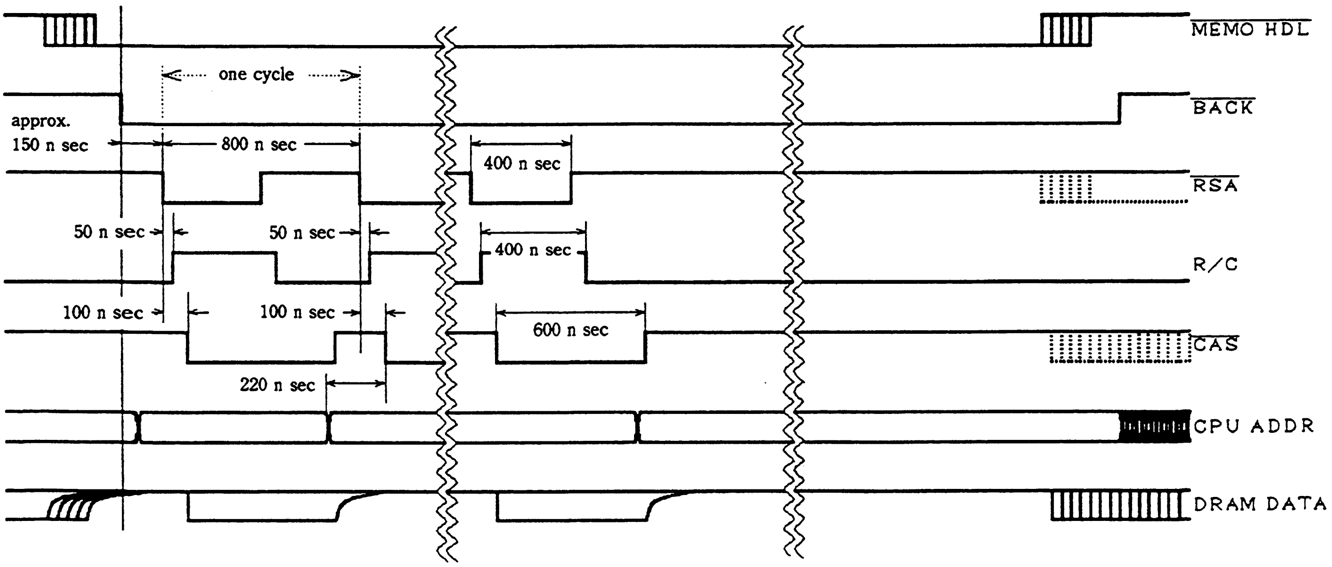
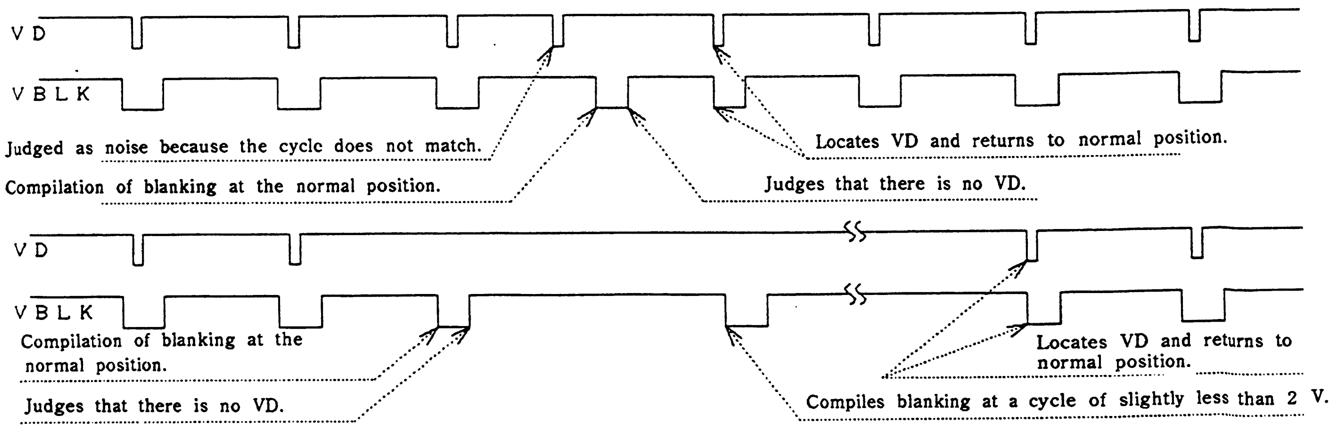


Fig. 4-12 MMU Operation in H Blanking Timing Chart

4-6-3. Sync Control

In the MMU Block, Sync is treated as an important control signal.
Because there is AFC in the CPU, there are no cases of the VD signal not operating. However, this situation can cause faulty operation or failure to operate regarding the HD signal.
A horizontal synchronizing signal is supplied from the VA-26 Board to the MMU block as the HD signal. This signal includes an internal HD signal that is used when outputting the memory screen to the monitor and an external HD signal used when outputting the input source to the monitor. There is switching between these two types in the VA-26 Board to supply the signal. Regarding the external HD signal, there are various situations that are possible for cycle, sag, noise, etc. As a result, use is made in the VA-26 board signal of an HD signal that has been passed through an AFC. If this AFC is not adjusted properly it is not possible to insure operation of the MMU.
The HD signal that is supplied becomes the $\overline{\text{SW'D-HD}}$ signal which is supplied to the CPU for Vf judgment.
In addition, there is creation of an H-Blanking signal known as HDL which is used for mode changing and timing adjustment in the MMU block. There are two types of HDL signal which have slightly different phases. These receive the names $\overline{\text{MEMO-HDL}}$ signal which does not function during V Blanking and the $\overline{\text{SW'D-HDL}}$ signal which functions as an HDL signal even during V Blanking.
These two signals are used differently in the MMU block. The $\overline{\text{SW'D-HDL}}$ signal is used as the timing signal when the CPU releases a bus to the gate array. The $\overline{\text{MEMO-HDL}}$ signal is used for the timing by which the gate array can occupy the bus and for the timing at the end point.
A vertical synchronizing signal is supplied from the VA-26 Board to the MMU block as the VD signal. This signal includes an internal VD signal that is used when outputting the memory screen to the monitor and an external VD signal when outputting the input source to the monitor. There is switching between these two in the VA-26 Board to supply the signal. AFC for the VD signal differs from that for the HD signal because it is carried out with the CPU software. A VD signal with AFC is used as the $\overline{\text{VBLK IN}}$ signal. This is used as the V blanking signal. It is synchronized with the horizontal synchronizing signal in IC4 of the Sync circuit and becomes the $\overline{\text{VBLK}}$ signal.
The VD signal input to the CPU undergoes phase comparison with the $\overline{\text{SW'D-HD}}$ signal in the CPU and Vf (frame judgment) is determined. This Vf judgment is of a design that the coherence is not disturbed even when there is a certain amount of jitter in the synchronizing signal. Thus, there is no chance of ODD and EVEN being confused. Also, because there is AFC there will be no false operation even when noise is mixed in with the VD signal or when there is momentary cutting of the signal. However, if the VD is cut or if the cycle changes, there is generation in the CPU of a hypothetical VD at a cycle of slightly less than 2 V and there is output of blanking corresponding to this. (Please refer to figure 4-13.)



Judged as noise because the cycle does not match.

Compilation of blanking at the normal position.

Locates VD and returns to normal position.

Judges that there is no VD.

Compilation of blanking at the normal position.

Judges that there is no VD.

Locates VD and returns to normal position.

Compiles blanking at a cycle of slightly less than 2 V.

Fig. 4-13 Relationship Between VD and V Blanking

4-7. DRAM Control Block

4-7-1. General

IC29 performs the DRAM control.
Refer to the manual for the UP-5000 Series for an internal description of IC29.
A DRAM differs from a SRAM and other memories because its operation is somewhat more complex. Because it is a memory, it has a data bus and an address bus. The address bus uses time division to transmit information on the RAS address (vertical address in relation to video image) and the CAS address (horizontal address in relation to video image). These time division signals are an $\overline{\text{RAS}}$ and $\overline{\text{CAS}}$ signal. The RAS address is latched inside the DRAM at the rise-fall edge of the $\overline{\text{RAS}}$ while the CAS address is latched at the rise-fall edge of the $\overline{\text{CAS}}$ signal. There are many ways in which these two signals are used. In the UP-5100 Series there are the following three usage modes.

1) High-speed page mode (read cycle, early write cycle)
2) Random access mode (read cycle, early write cycle)
3) RAS only refresh mode

4-7-2. High-speed page mode (read cycle, early write cycle)

In the high-speed page mode, the CAS address is changed after first latching the RAS address. In this case, the RAS address does not change, only the CAS address changes. The high-speed page mode is used during the H usual picture area period [However, only when accessing the DRAM, for example, during monitor out of an image stored in the DRAM (frame memory)].

4-7-3. Random (read cycle, early write cycle)

Although the entry says Random Access Mode, this refers to the normal read mode and early write mode. Both the RAS and CAS addresses are designated for each single point in the frame memory. This is used when writing captions, writing the service man mode patterns, transmitting print data or during refresh (no DRAM refresh mode).

4-7-4. RAS only refresh mode

The RAS only refresh mode is used to initialize the DRAM immediately following power source rise. With the 2M DRAM and 4M DRAM (PAL-2 FRAME models) it is necessary to refresh all RAS a minimum of 8 times as initialize prior to operating the DRAM. As a result, when the power is ON, RAS only refresh is carried out.
These three modes are shown in Figures 4-4 to 4-16. The timing charts show examples that have been used with the circuit.

Mode in use	Mode description	Contents that are used
High-speed page mode	Possible to access the CAS coordinates without changing the RAS coordinates. The RAS coordinates are first designated and then the CAS coordinates are designated in succession.	Used to access the DRAM during H usual picture area. This is used because image sampling is in a horizontal direction. the RAS coordinates are fixed within 1H and because it is faster.
Random Access Mode	It is possible to separately give the RAS coordinates and CAS coordinates AND randomly access the memory space. As opposed to the above mode, the access is slower since the RAS coordinats are supplied.	This is used for vertical sampling during data transmission with H blanking or retaining DRAM data (refresh). This mode is also used for caption input, etc.
RAS only Rehresh Mode	This mode, which is used for refreshing the DRAM, is one of serveral methods. Only the RAS coordinates are supplied and not the CAS coordinates.	After turning the power ON, it is necessary to initialize the DRAM. This mode is required for one of these methods. It accesses all RAS coordinates 8 times.

Table. 4-4 Description of DRAM Modes

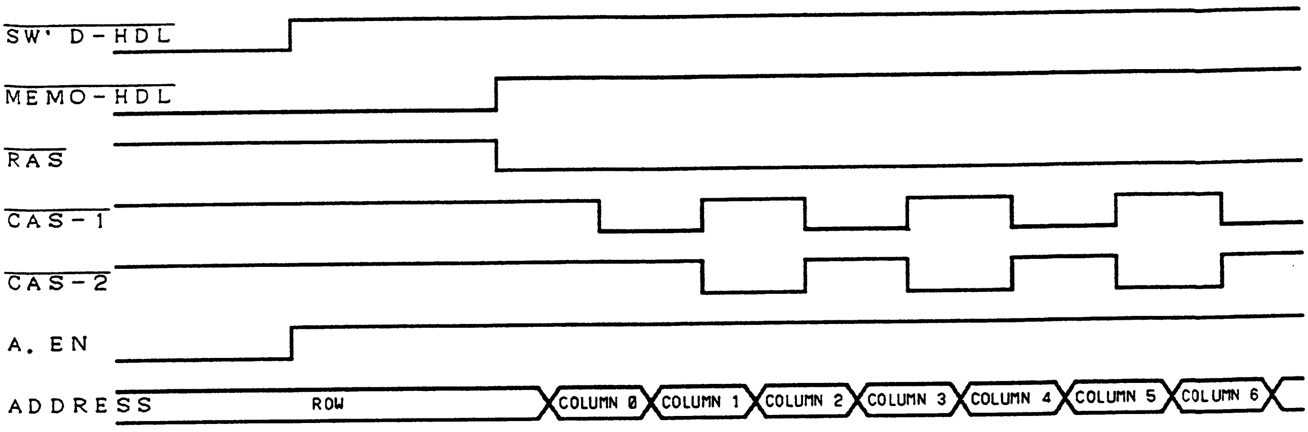

SW' D-HDL
MEMO-HDL
RAS
CAS-1
CAS-2
A. EN
ADDRESS
ROW
COLUMN 0
COLUMN 1
COLUMN 2
COLUMN 3
COLUMN 4
COLUMN 5
COLUMN 6

Fig. 4-14 Movement of signals during the high-speed page mode

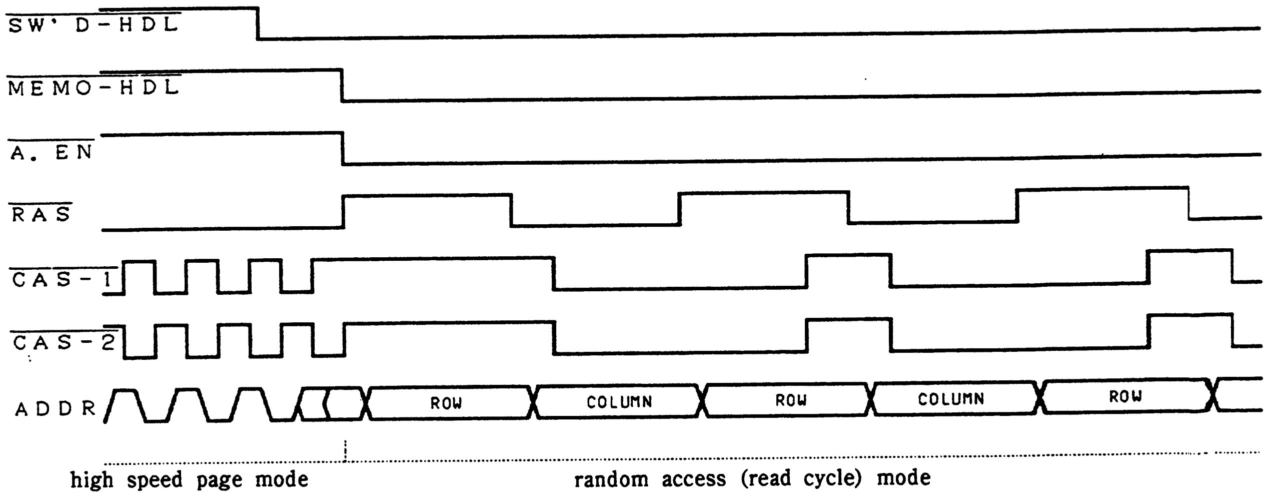

SW' D-HDL
MEMO-HDL
A. EN
RAS
CAS-1
CAS-2
ADDR
ROW
COLUMN
ROW
COLUMN
ROW
high speed page mode
random access (read cycle) mode

Fig. 4-15 Movement of signals during random access

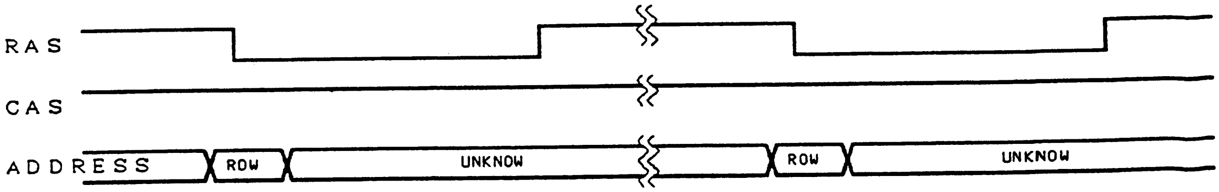

RAS
CAS
ADDRESS
ROW
UNKNOW
ROW
UNKNOW

Fig. 4-16 Movement of signals during RAS only refresh

4-8. Select/Masking Block

Figure 4-17 shows the equalizing circuit of this block. The circuit is composed of 2 gate arrays (2 varieties), 3 MASK-ROM's (3 varieties) and one 8-bit latch IC1.

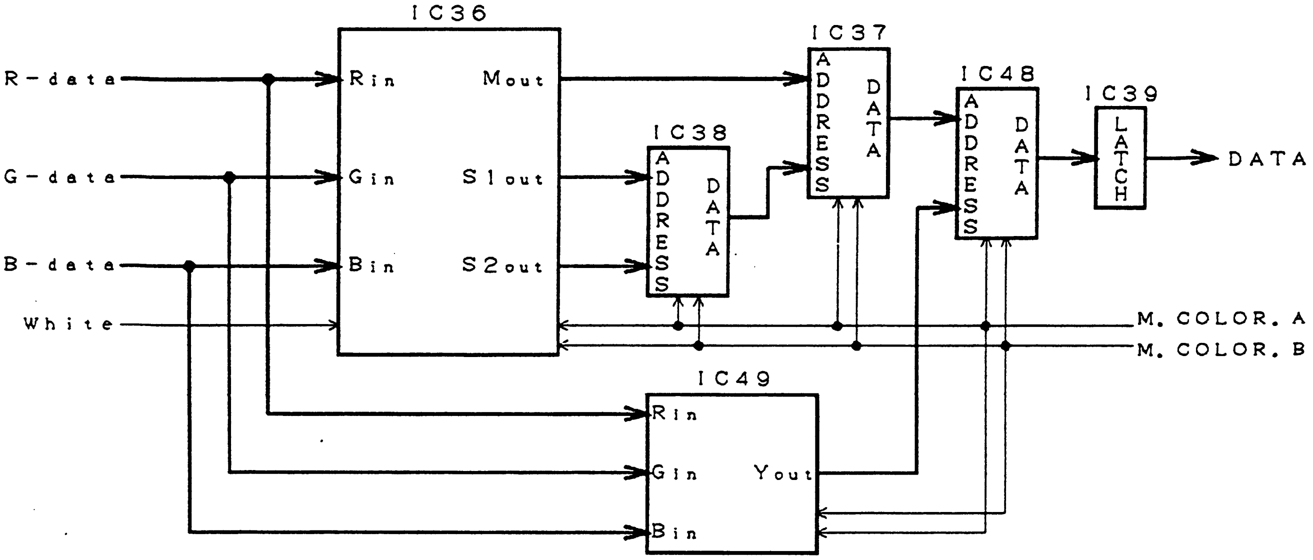

IC36
IC37
IC48
IC39
IC38
IC49
R-data
G-data
B-data
White
Rin
Gin
Bin
Mout
S1out
S2out
ADDRESS
DATA
LATCH
DATA
M. COLOR. A
M. COLOR. B
Yout

Fig. 4-17 Equalizing Circuit of the Select/Masking Block

IC36 divides the R · G · B data into Main color and Sub color according to the color information (M. COLOR. A, B) to be printed. Chart 3-5 shows the relationship among print color, main color and sub-color.

Color to be printed	Signal to become main color	Signal to become Sub1 color	Signal to become Sub2 color	M. COLOR(A, B)
Yellow	$\overline{B}$	$\overline{R}$	$\overline{G}$	(1, 0)
Magenta	$\overline{G}$	$\overline{B}$	$\overline{R}$	(0, 1)
Cyan	$\overline{R}$	$\overline{B}$	$\overline{G}$	(1, 1)
Black	$\overline{G}$	$\overline{B}$	$\overline{R}$	(0, 0)

Table. 4-5 Relationship between print color and main/sub color

The video data selected for each signal as shown in table 4-5 is input to IC37 and IC38 from IC36. These two Mask ROM's are used as basic masking ROM's. They include maps for elimination and calculation of unnecessary elements for the print coloring materials and for making calculations to improve color from visual inspection. IC48 is a brightness masking ROM which has the function of increasing the color reproduction of blue. IC49 carries out the task of calculating the blue brightness data and sending this to IC48. The data output IC48 via this type of path signifies the transfer energy of the pigment during printing. This energy data is converted into transfer time data in the γROM of the SY-9 Board, undergoes various types of image processing and is transferred to the thermal head as current time data.

The output data from IC49 displays indefinite data period due to propagation and delay of the three masking ROM's. In consideration also of the timing margin in the circuit of the SY-9 Board, data is latched at IC39 so that there is no indefinite data period. This IC latch clock is output from IC30 (MMU Block). However, because this has been programmed in a way that considers the delay phase suitable to the FMY circuit sequence, the most suitable phase is provided.

The IC39 output data is output to the SY-9 Board with a clock that is synchronized to the data.

When the CPU (IC28) receives a Data Enable signal from the SY-9 Board, the print data is transferred from the DRAM via this block together with output of a clock (known either as WRP or DATA CLK) synchronized with the data for transfer to the SY-9 Board. (Refer to figure 4-18.)

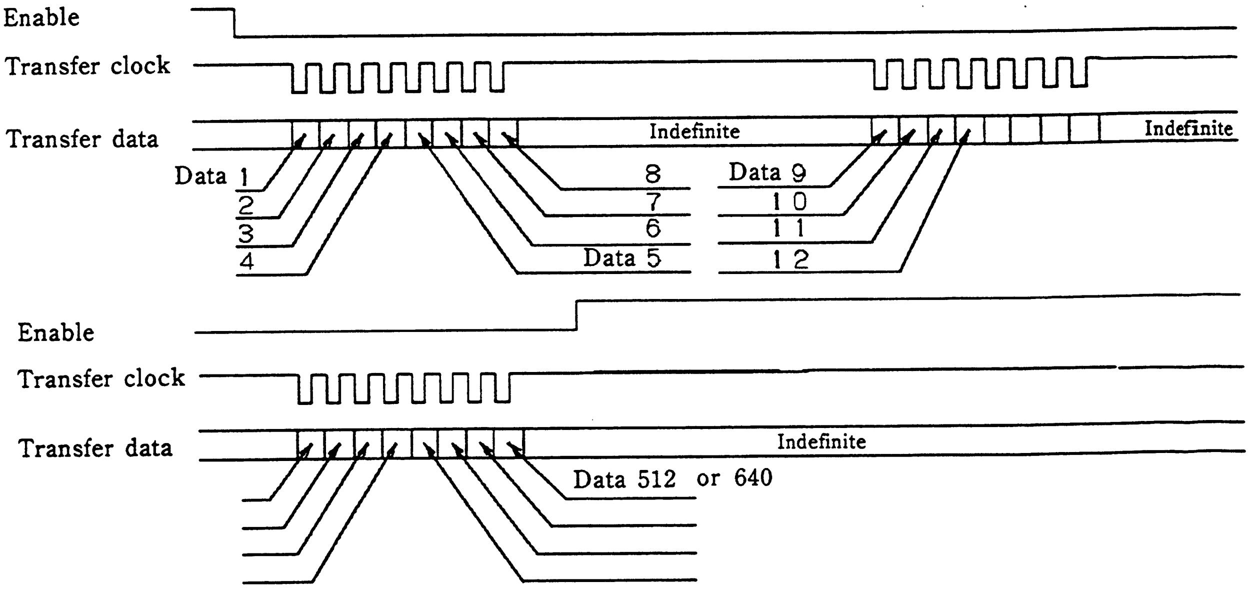


Fig.4-18 Transfer of Printing Data

The H usual picture area time is the period when the data is cut off. During the H usual picture area period there is no transfer of data. Please refer to the description of the MMU Block.

For NTSC specifications, the total data count is 512 (UP-5100, 5200MD Series), for PAL specifications the total data count is 640 (UP-5200MDP Series).

4-9. SYNC Block

In addition to gate array (IC14 and IC5), and delay line (IC6) and XOR (IC25), this is composed of a crystal (X1), etc. This circuit is the same as that in the UP-5000. Refer to the information for that model.

X1 is a 14.31818 MHz crystal for NTSC specifications (UP-5100, 5200MD Series) and a 14.1875 MHz crystal for PAL specifications (UP-5200MDP Series). IC5 is used to synchronize the X1 oscillation clock H and uses output from the Pin 5. Although we speak in terms of synchronous, there are actually several clocks in which the oscillation clock is slightly delayed in the IC in order to select at the right time the clock that matches the HD phase.

The clock output from IC5 is used as a sampling clock. This signal is divided into two, one signal is input to IC4 and the other is input to the IC6 delay lie.

Inside IC4 this clock is used for generation of the CAS signal during the H usual picture area period (high-speed page mode) and for phase adjustment of H blanking (HDL signal). As was explained for the A/D and D/A blocks, the signal input to IC6 is used as an analog/digital conversion clock.

IC4 is used to generate the CAS signal during the H usual picture area period (high-speed page mode) and for generation of H blanking (HDL signal). Regarding the CAS signal there is generation of two CAS signals ($\overline{\text{CAS1}}$, $\overline{\text{CAS2}}$) in which the phase differs by 180 degrees. These each normally function at 2 fsc (approx. 7 MHz). When using SPLIT-4/9 to store to the memory, the signals undergo thinning out before being output. During HDL generation there is generation of two types of signals, $\overline{\text{MEMO-HDL}}$ and $\overline{\text{SW'D-HDL}}$. The $\overline{\text{SW'D-HDL}}$ signal is used by the CPU of the MMU block for releasing the bus and other tasks.

These HDL signals make it possible to program the phase in relation to the fall of the input HD. The terminals include HDL-ADJ 1 to 11 and HDL-SET 1 to 9. Phase adjustment is carried out by combining the numerical values input to the terminals.

(For details refer to the description of UP-5000.)

4-10. Signals flow in the various operation modes

4-10-1. General

Figure 4-20 is the total block diagram of the FMY-8 Board.
The description makes use of the block diagram in Figure 4-20 as the basis for describing the flow of signals for each operational mode.
The operational modes of the FMY-8 Board can be divided into the 7 modes shown below.

1) Input Mode (Monitor out of input signal)
2) Memory In Mode (Stores input signals in the frame memory)
3) Memory Mode (Monitor out of signals in memory)
4) Dram Refresh Mode (Retention of frame memory data)
5) Print Data Transfer Mode (Transfer of print data to SY-9 Board)
6) Caption Writing Mode (Writing of data to frame memory)
7) Palette Writing Mode (Writing of data to palette RAM)

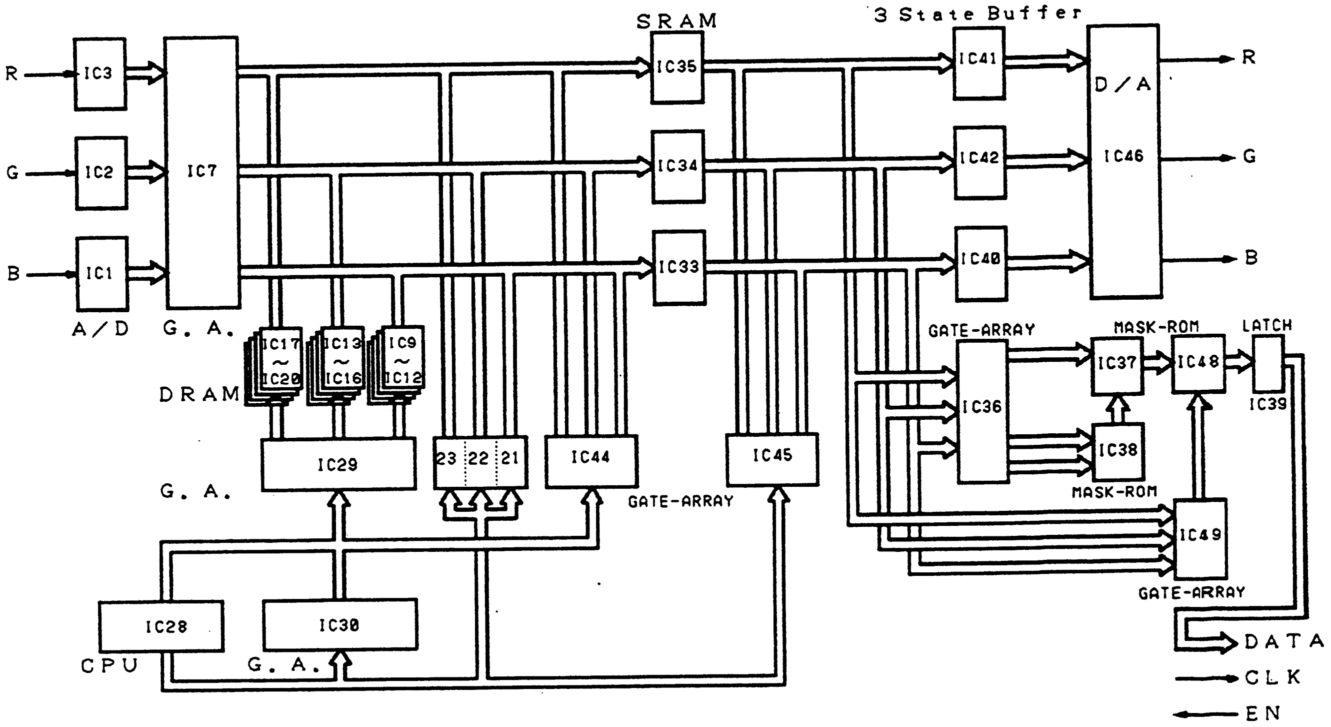

SRAM
3 State Buffer
R
G
B
IC3
IC2
IC1
A/D
IC7
G. A.
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
DRAM
IC29
G. A.
23
22
21
IC44
GATE-ARRAY
IC45
IC35
IC34
IC33
IC41
IC42
IC40
D/A
IC46
R
G
B
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
DATA
CLK
EN
IC28
CPU
IC30
G. A.

Fig. 4-20 Total Block Diagram (FMY-8 Board)

4-10-2. Input Mode

This mode is used to output the input signals to the monitor via the FMY-8 Board.
R·G·B analog signals input from the VA-26 Board undergo A/D conversion to become 8 bit digital signals.
These signals pass through a Palette-SRAM where the color and contrast can be changed, and then undergo D/A conversion to return them to analog signals which are sent to the VA-26 Board.

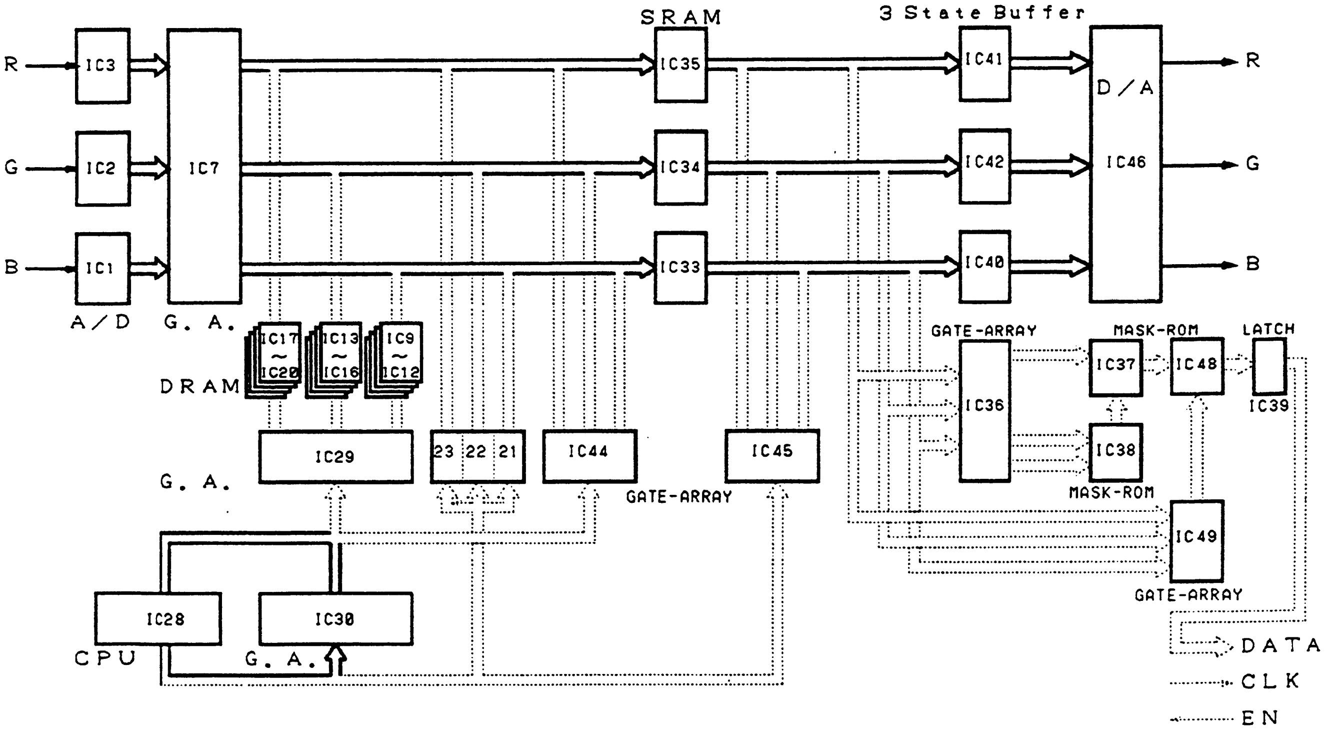

R
G
B
IC3
IC2
IC1
A/D
IC7
G. A.
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
DRAM
IC29
G. A.
23
22
21
IC44
IC45
GATE-ARRAY
IC28
CPU
IC30
G. A.
SRAM
IC35
IC34
IC33
3 State Buffer
IC41
IC42
IC40
D/A
IC46
R
G
B
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
DATA
CLK
EN

Fig. 4-20 Monitor out of input signals

4-10-3. Memory In Mode

This is the mode for storing input signals in the frame memory.
R·G·B analog signals input from the VA-26 Board undergo A/D conversion to become 8 bit digital signals.
These signals are input to the DRAM although a CAS address is supplied from IC29 (DRAM controller) in order to synchronize them with the A/D conversion clock.
IC29 is programmed from IC30 (IC composed of MMU) during the H blanking period.

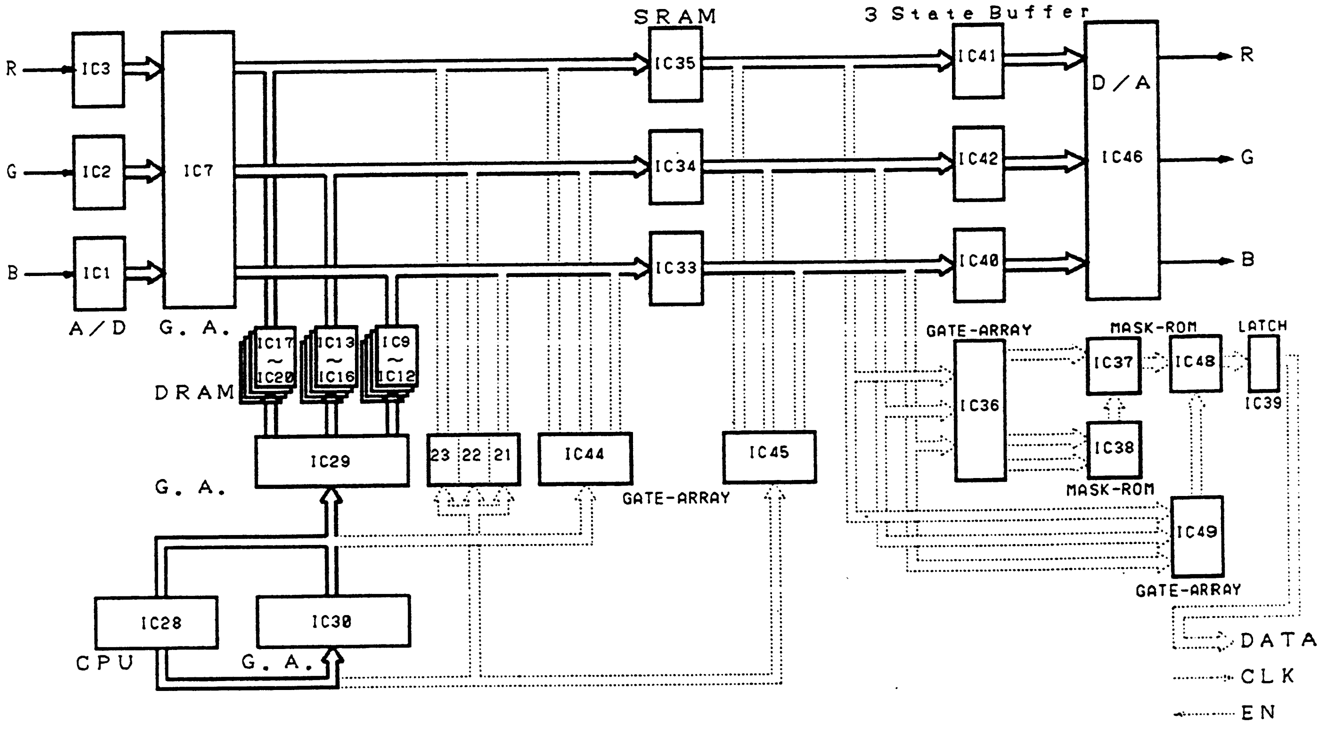
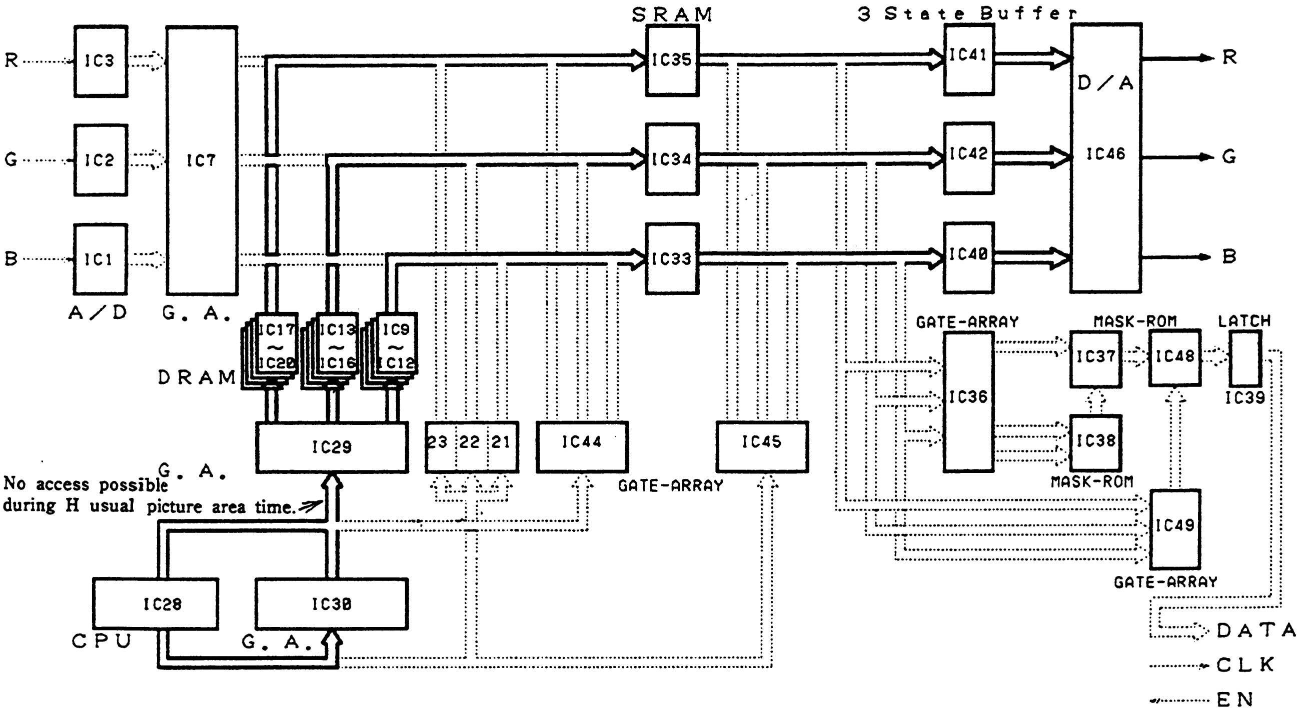

SRAM
3 State Buffer
R
IC3
G
IC2
IC7
B
IC1
IC35
IC34
IC33
IC41
IC42
IC40
D/A
IC46
R
G
B
A/D
G. A.
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
DRAM
IC29
G. A.
23 22 21
IC44
IC45
GATE-ARRAY
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
IC28
CPU
IC30
G. A.
DATA
CLK
EN

Fig. 4-21 Flow of signals during memory in

4-10-4. Memory Mode

This mode is used to output at video rate the video data that is stored in the frame memory and to carry out monitor out.

The digital video signals output from the frame memory (DRAM) pass through a Palette-SRAM where the color and contrast can be changed. They undergo D/A conversion to convert them back into analog video signals which are sent to the VA-26 Board.


R
G
B
IC3
IC2
IC1
A/D
IC7
G. A.
DRAM
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
IC29
G. A.
IC28
CPU
IC30
G. A.
SRAM
IC35
IC34
IC33
23 22 21
IC44
IC45
GATE-ARRAY
3 State Buffer
IC41
IC42
IC40
D/A
IC46
R
G
B
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
DATA
CLK
EN

No access possible during H usual picture area time.

Fig. 4-22 Monitor out of images that have been stored in the memory.

4-10-5. Refresh Mode

Unless the DRAM accesses all RAS addresses during a fixed period, it is not possible to retain the data it is holding. For the DRAM's used in this device, the 1M DRAM must access 512 addresses within 8 msec and the 2M/4M DRAM must access 512/1024 addresses (RAS) within 16 msec.

At the FMY-8 circuit board, the 8-bit address that is connected in the RAS direction during the H blanking period is accessed.

Although this differs from the DRAM refresh mode, the purpose is the same, retention of the DRAM data. Also, although the DRAM data is output on a bus, it has no meaning.

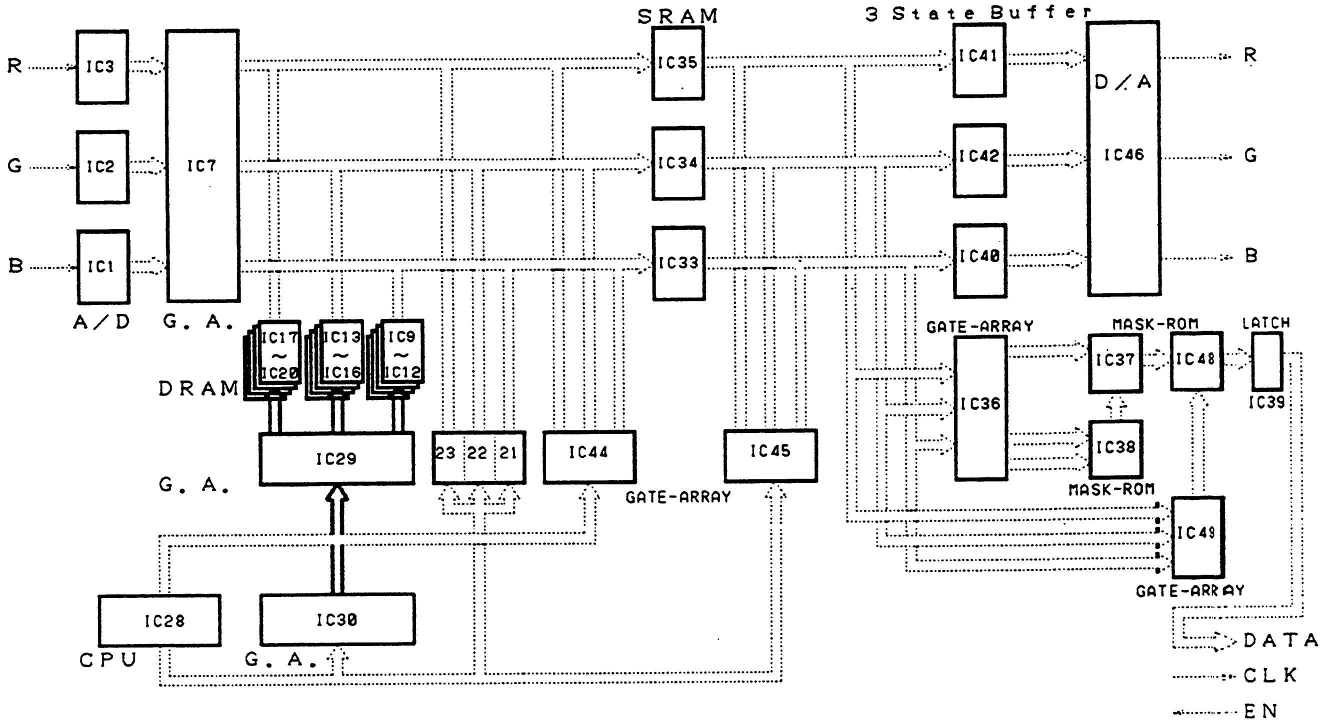

SRAM
3 State Buffer
R
G
B
IC3
IC2
IC1
IC7
A/D
G. A.
IC35
IC34
IC33
IC41
IC42
IC40
D/A
IC46
R
G
B
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
DRAM
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
G. A.
IC29
23
22
21
IC44
GATE-ARRAY
IC45
IC28
CPU
IC30
G. A.
DATA
CLK
EN

Fig.4-23 DRAM Refresh Mode (during H blanking)

4-10-6. Print Data Transfer Mode

This has the same operation as the former refresh mode. The only difference is that the printed data is output to the SY-9 Board with the related signal.
During H blanking period there is access of a maximum of 8 dots of addresses in the RAS direction. This is true when the figure is less than 8 bits.

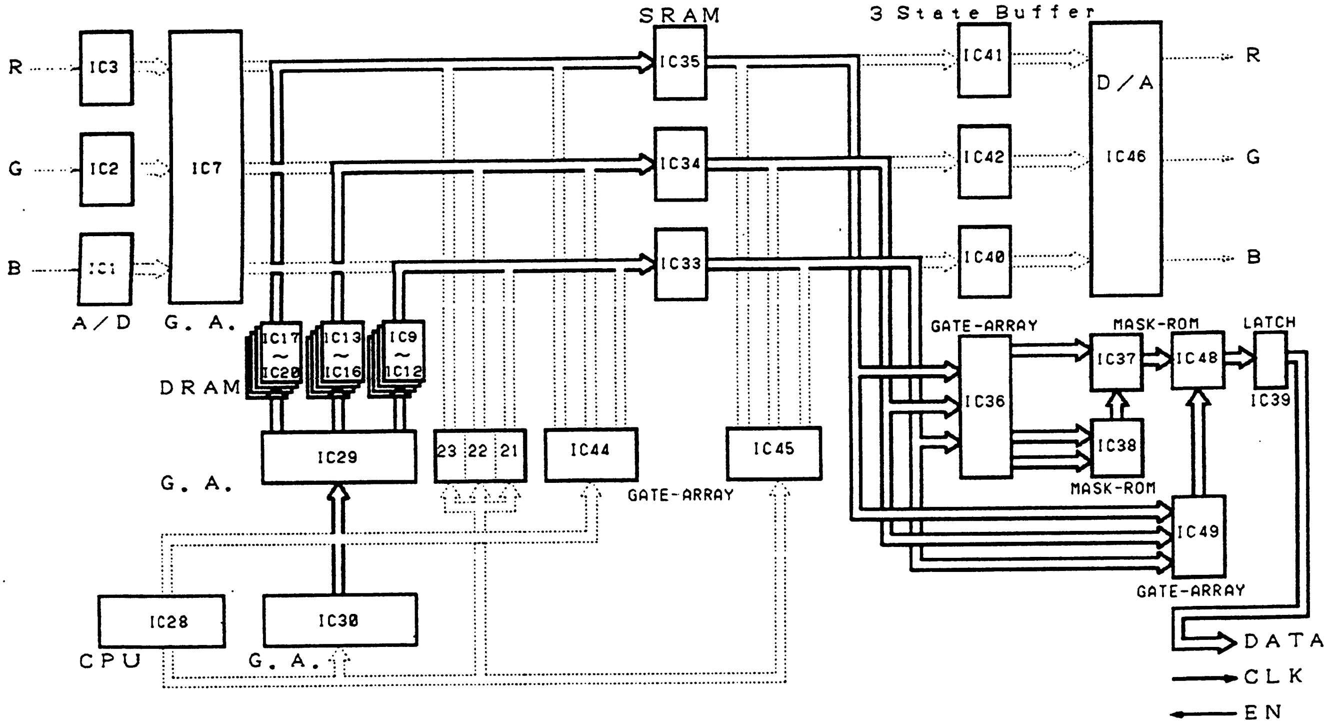
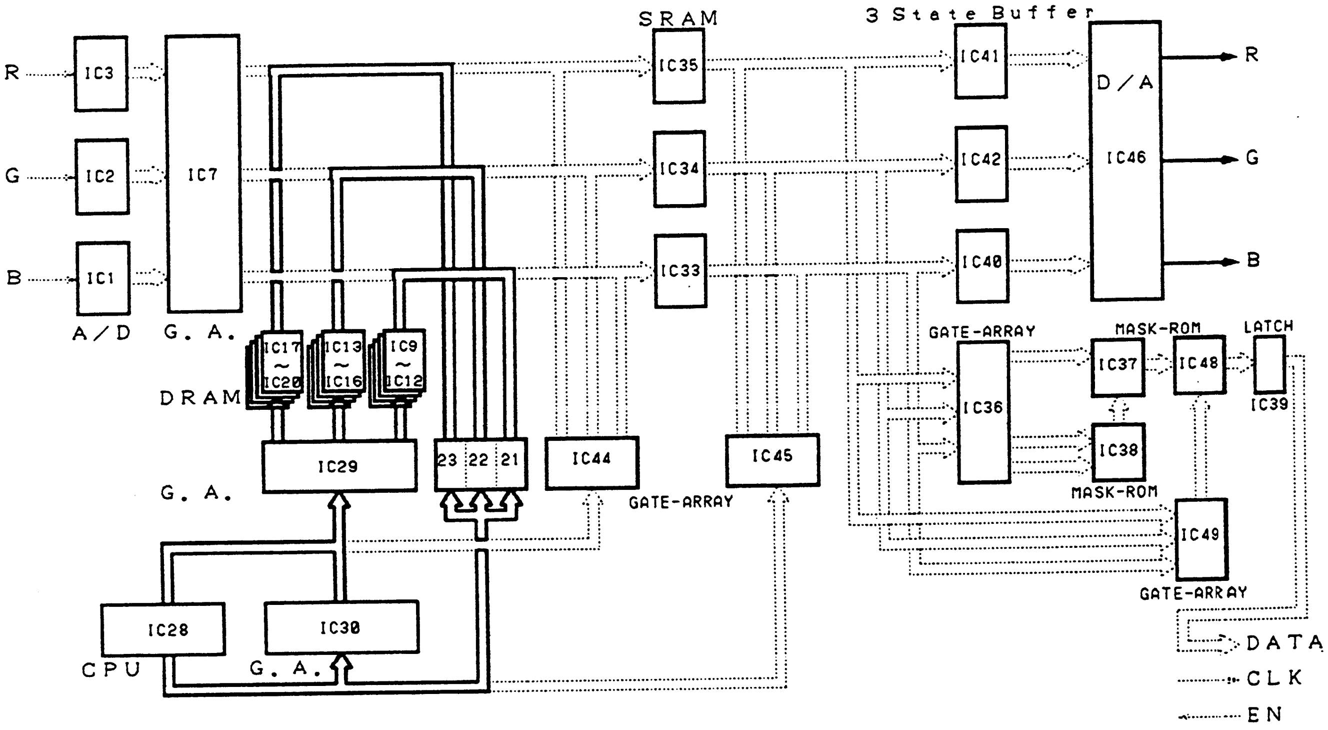

SRAM
3 State Buffer
R
G
B
IC3
IC2
IC1
IC7
A/D
G. A.
IC35
IC34
IC33
IC41
IC42
IC40
D/A
IC46
R
G
B
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
DRAM
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC29
G. A.
23
22
21
IC44
IC45
GATE-ARRAY
IC49
GATE-ARRAY
IC28
CPU
IC30
G. A.
DATA
CLK
EN

Fig. 4-24 Flow of signals during transfer of print data

4-10-7. Caption Writing Mode

With the UP-5100/5200MD/5200MDP Series, the captions are written to the frame memory. This caption data is written to the DRAM during V blanking.



SRAM
3 State Buffer
R
G
B
IC3
IC2
IC1
IC7
A/D
G. A.
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
DRAM
IC29
G. A.
23
22
21
IC44
IC45
GATE-ARRAY
IC28
CPU
IC30
G. A.
IC35
IC34
IC33
IC41
IC42
IC40
D/A
IC46
R
G
B
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
DATA
CLK
EN

Fig. 4-25 When writing captions to the DRAM (during V Blanking)

4-10-8. Palette Writing Mode

With the UP-5100/5200MD/5200MDP Series, it is possible to adjust color after storage in the memory. This color adjustment is made possible by rewriting the data in the Palette-SRAM and is carried out during V Blanking.

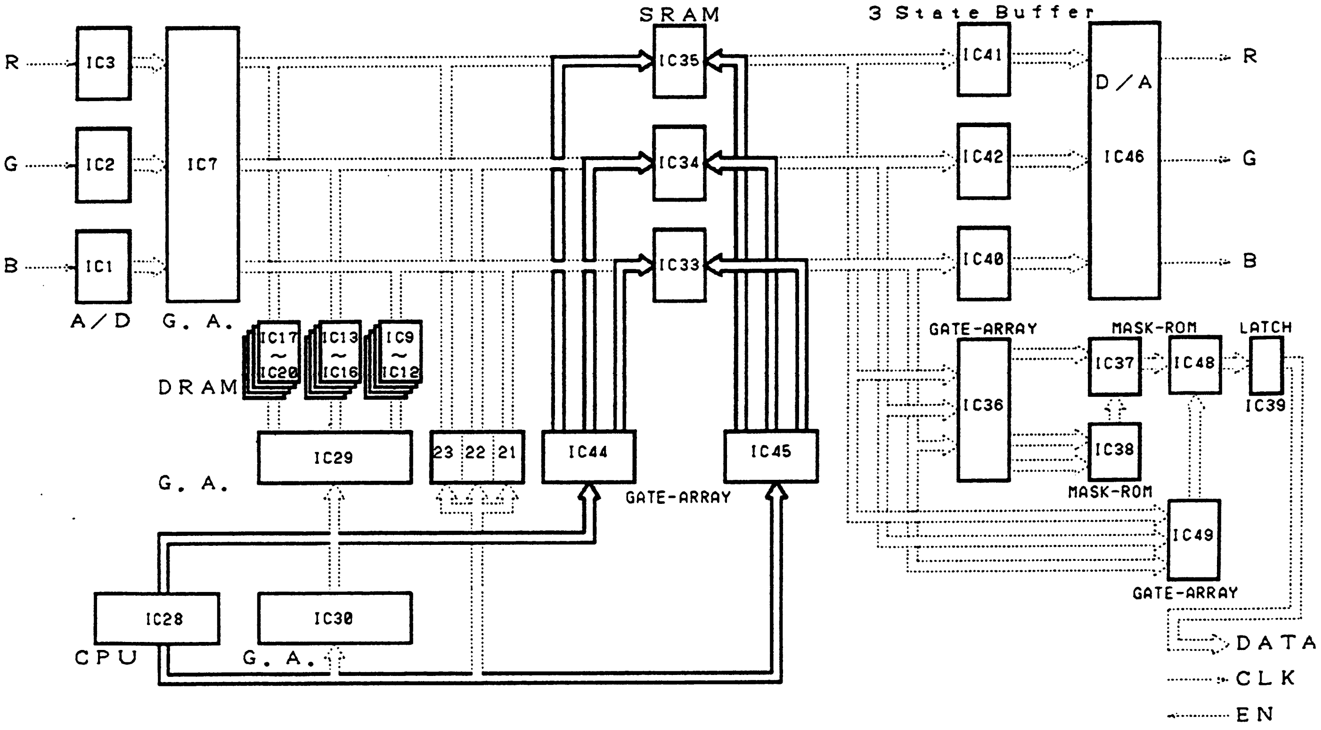

R
G
B
IC3
IC2
IC1
A/D
IC7
G. A.
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
DRAM
IC29
G. A.
23
22
21
IC44
IC45
GATE-ARRAY
IC28
CPU
IC30
G. A.
SRAM
IC35
IC34
IC33
3 State Buffer
IC41
IC42
IC40
D/A
IC46
R
G
B
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
DATA
CLK
EN

Fig. 4-26 When changing the color palette data (during V Blanking)

5. SYSTEM CONTROL (SY-9 BOARD)

5-1. General

The SY-9 Board is composed of the following three functions.

1) System Control
2) Mechanism Control
3) Head Control

Figure 5-1 shows the flow of signals in the SY-9 Board.

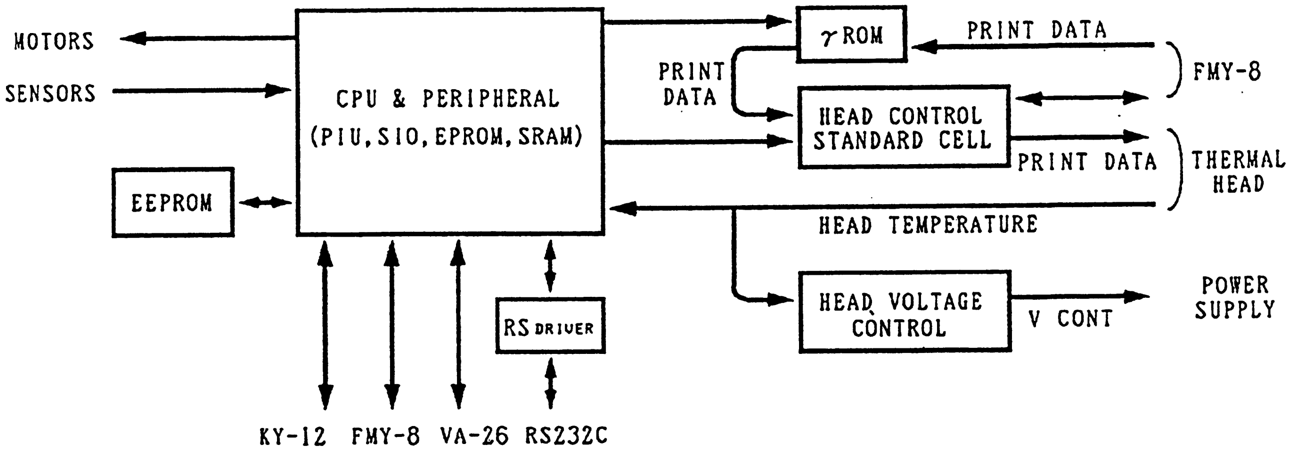

MOTORS
SENSORS
EEPROM
CPU & PERIPHERAL (PIU, SIO, EPROM, SRAM)
RS DRIVER
KY-12
FMY-8
VA-26
RS232C
PRINT DATA
γROM
PRINT DATA
FMY-8
HEAD CONTROL STANDARD CELL
PRINT DATA
THERMAL HEAD
HEAD TEMPERATURE
HEAD VOLTAGE CONTROL
V CONT
POWER SUPPLY

Fig. 5-1 The flow of signals in the SY-9 Board

5-2. CPU and Peripheral Circuits

This is composed of a CPU (ICI: uPD78310A), a program-use EPROM (IC4: AM27C512), a SRAM (IC6: CXK5814P) for additional memory, a parallel board PIU (IC2: uPD71055), serial communications board SIO (IC3: MB89371APF), a non-volatile memory for setting memory EEPROM (IC9 and IC10: CXK1005P).

5-2-1. Reset Circuit

The reset circuit uses a reset-use IC (IC18: PST523C). During POWER ON (or When the power is switched off, then immediately on again.) there is output of a 70 msec reset signal. This reset signal is also sent to the FMY-8 Board.

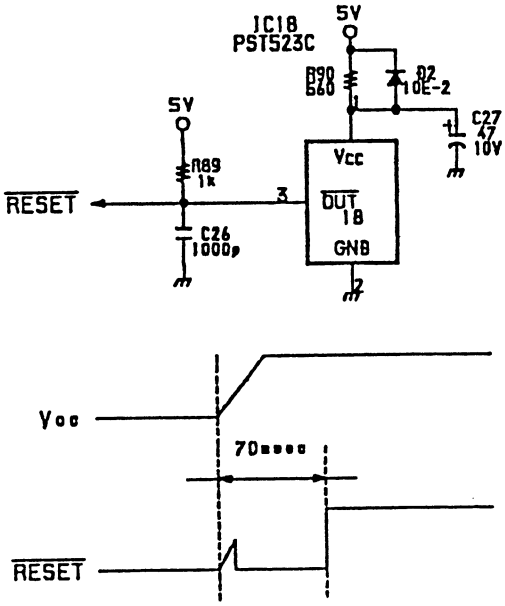

IC18
PST523C
5V
R90
560
D2
10E-2
C27
47
10V
5V
R89
1k
$\overline{\text{RESET}}$
3
Vcc
$\overline{\text{OUT}}$
18
GNB
C26
1000p
2
Voo
70msec
$\overline{\text{RESET}}$

Fig. 5-2 Reset Circuit

5-2-2. External I/O Address Assignment

ADDRESS	EXTERNAL I/O		
0000 ↓ 7FFF	EPROM		AM27C512-205DC (IC4)
8000 ↓ 87FF	SRAM		CXK5814P-35L (IC6)
9000 ↓ 900D	STANDARD CELL		HDC443V2 (IC11)
FFB0	PIU	Port A	uPD71055GB-3B4 (IC2)
FFB1		Port B	
FFB2		Port C	
FFB3		Control	
FFB4 ↓ FFB7	SIO	CH 1	MB89371APF (IC3)
FFB8 ↓ FFBB		CH 2	
FFBC	LATCH		74HC573NS(IC15)
FFBD	BUFFER		SN74HC240NS(IC23)

Table. 5-1

5-2-3. Address Decoder

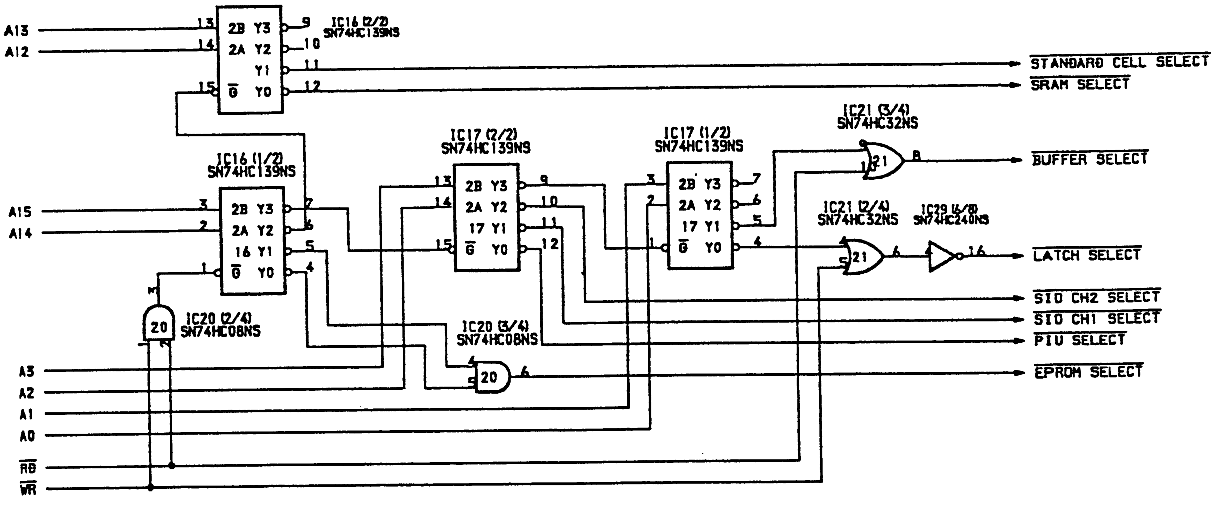

A13
A12
A15
A14
A3
A2
A1
A0
RD
WR
IC16 (2/2) SN74HC139NS
IC16 (1/2) SN74HC139NS
IC17 (2/2) SN74HC139NS
IC17 (1/2) SN74HC139NS
IC20 (2/4) SN74HC08NS
IC20 (3/4) SN74HC08NS
IC21 (3/4) SN74HC32NS
IC21 (2/4) SN74HC32NS
IC29 (4/8) SN74HC240NS
STANDARD CELL SELECT
SRAM SELECT
BUFFER SELECT
LATCH SELECT
SIO CH2 SELECT
SIO CH1 SELECT
PIU SELECT
EPROM SELECT

Fig. 5-3 Address Decoder Circuit

5-2-4. CPU (IC1: uPD78310A) Port signal

Port No.	I/O	SIGNAL NAME
P00	0	$\overline{\text{SYS ENABLE}}$ (To KY-12)
P01	0	EEPROM2 INI/$\overline{\text{CS}}$
P02	I	EEPROM1 $\overline{\text{BUSY}}$
P03	I	EEPROM2 $\overline{\text{BUSY}}$
P04	*	EEPROM I/01
P05	*	EEPROM I/02
P06	*	EEPROM I/03
P07	*	EEPROM I/04
P10	0	$\overline{\text{STEP MOTOR DRIVE}}$ 01
P11	0	$\overline{\text{STEP MOTOR DRIVE}}$ 02
P12	0	$\overline{\text{STEP MOTOR DRIVE}}$ 03
P13	0	$\overline{\text{STEP MOTOR DRIVE}}$ 04
P14	0	HEAD MOTOR IN1
P15	0	HEAD MOTOR IN2
P16	0	EEPROM CLOCK
P17	0	EEPROM1 INI/$\overline{\text{CS}}$
P20	I	NMI
P21	I	RIBBON CODE EDGE
P22	I	RS232C RCVRDY
P23	I	MMU RCVRDY
P24	0	TXD (To KY-12)
P25	I	RXD (From KY-12)
P26	I	NTSC/$\overline{\text{PAL}}$
P27	I	KY ENABLE (From KY-12)
P30	I	RIBBON FG
P31	I	NO CONNECT
P32	I	RIBBON FG
P33	I	NO CONNECT
P34	0	RIBBON MOTOR PWM DRIVE
P35	0	FAN MOTOR PWM DRIVE
P36	0	STEP MOTOR VOLT. SW
P37	0	REMOTE2 $\overline{\text{BUSY}}$

Table. 5-2

5-2-5. CPU (IC1: uPD78310A) A/D Input Signal

Port No.	I	SIGNAL NAME
AN0	I	HEAD TEMPERATURE
AN1	I	ROOM TEMPERATURE
AN2	I	NO CONNECT
AN3	I	NO CONNECT

Table. 5-3

5-2-6. PIU (IC2: uPD71055GB-3B4) Port Signal

Port No.	I/O	SIGNAL NAME
PA0	0	$\overline{\mathrm{PRINT}}$
PA1	0	$\overline{\mathrm{PRINT\ START}}$
PA2	0	TIMING PULSE
PA3	0	FAN CONT
PA4	0	NO CONNECT
PA5	0	HALFTONE/$\overline{\mathrm{NORM}}$
PA6	0	RIBBON 1 (γ ROM A10)
PA7	0	RIBBON 2 (γ ROM A11)
PB0	0	M COLOR A (γ ROM A8)
PB1	0	M COLOR B (γ ROM A9)
PB2	0	INPUT SIGNAL SELECT 1
PB3	0	INPUT SIGNAL SELECT 2
PB4	0	INPUT SIGNAL SELECT 3
PB5	0	NO CONNECT
PB6	0	SORCE/$\overline{\mathrm{THROUGH}}$
PB7	0	VCONT OFF/$\overline{\mathrm{ON}}$
PC0	I	PAPER CHECK SENSOR 1
PC1	I	PAPER CHECK SENSOR 2
PC2	I	TRAY SENSOR
PC3	I	RGB/$\overline{\mathrm{YDIF}}$
PC4	I	ENTER JAMING SENSOR
PC5	I	PAPER EDGE SENSOR
PC6	I	HEAD POSITION SENSOR
PC7	I	HOME POSITION SENSOR

Table. 5-4

5-2-7. LATCH (IC15: SN74HC573NS) Output Signal

Port No.	0	SIGNAL NAME
D0	0	NO CONNECT
D1	0	NO CONNECT
D2	0	NO CONNECT
D3	0	γ ROM A12
D4	0	γ ROM A13
D5	0	γ ROM A14
D6	0	γ ROM A15
D7	0	γ ROM A16

Table. 5-5

5-2-8. BUFFER (IC23: SN74HC240NS) Input Signal

Port No.	I	SIGNAL NAME
D0	I	RIBBON CASSETTE SW0
D1	I	RIBBON CASSETTE SW1
D2	I	RIBBON CASSETTE SW2
D3	I	RIBBON CASSETTE SW3
D4	I	MANUAL SWITCH S3
D5	I	MANUAL SWITCH S4
D6	I	$\overline{\text{SIGNNAL DETECT}}$
D7	I	REMOTE2 $\overline{\text{MEN IN}}$

Table. 5-6

5-2-9. Non-Volatile Memory (IC9 and IC10: CXK1005P)

IC9 is used for setting memory and IC10 is used for caption memory.

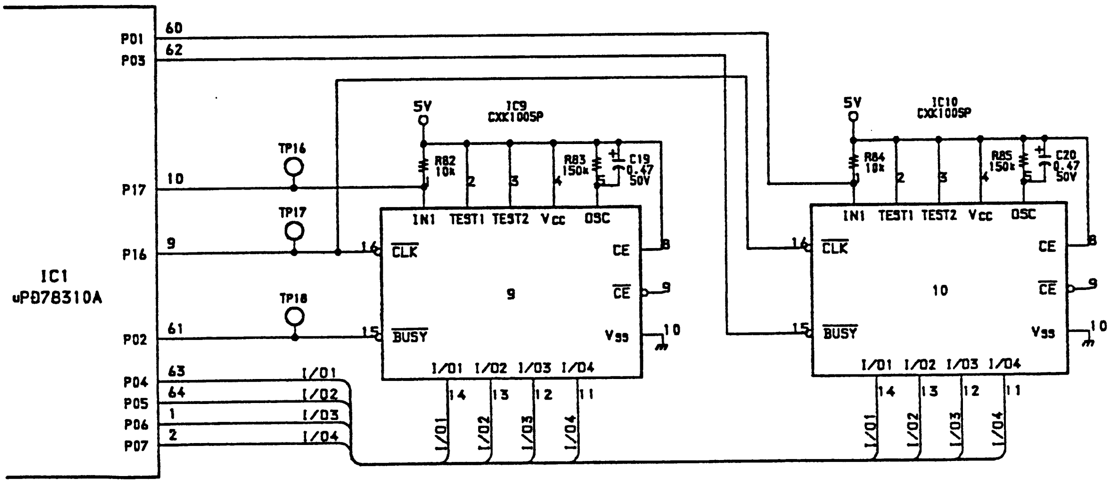

IC1
uPD78310A
P01
P03
P17
P16
P02
P04
P05
P06
P07
60
62
10
9
61
63
64
1
2
TP16
TP17
TP18
I/01
I/02
I/03
I/04
5V
IC9
CXK1005P
R82
10k
R83
150k
C19
0.47
50V
1
2
3
4
5
IN1
TEST1
TEST2
Vcc
OSC
16
CLK
15
BUSY
9
CE
8
CE
9
Vss
10
I/01
I/02
I/03
I/04
14
13
12
11
5V
IC10
CXK100SP
R84
10k
R85
150k
C20
0.47
50V
10

Fig. 5-4

1) DR: DATA READ

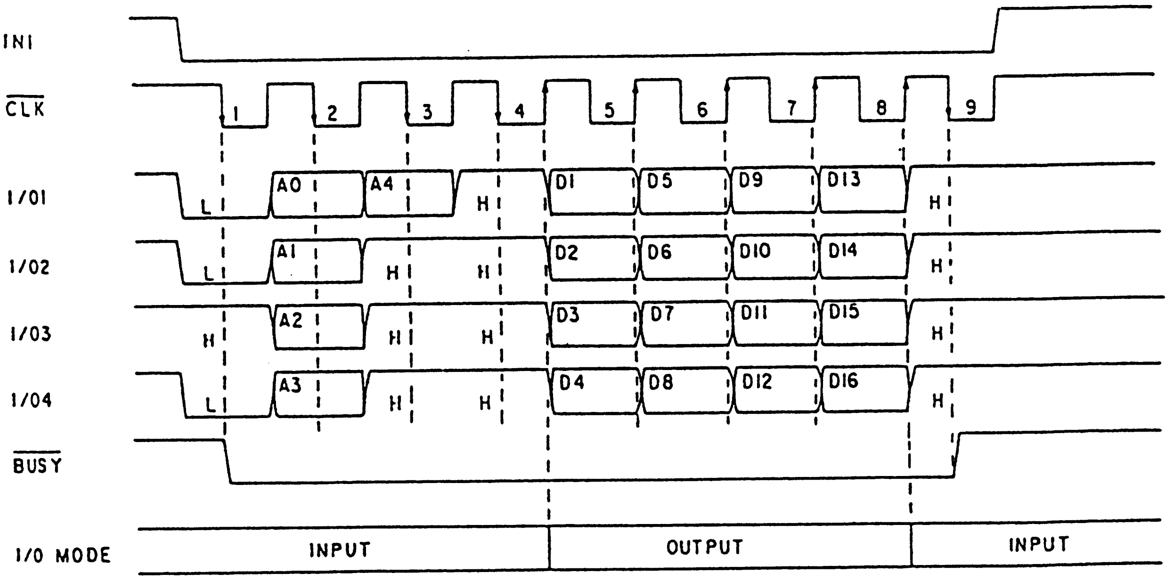

INI
CLK
1 2 3 4 5 6 7 8 9
I/O1
L A0 A4 H D1 D5 D9 D13 H
I/O2
L A1 H H D2 D6 D10 D14 H
I/O3
H A2 H H D3 D7 D11 D15 H
I/O4
L A3 H H D4 D8 D12 D16 H
BUSY
I/O MODE
INPUT
OUTPUT
INPUT

Fig. 5-5

2) DW: DATA WRITE

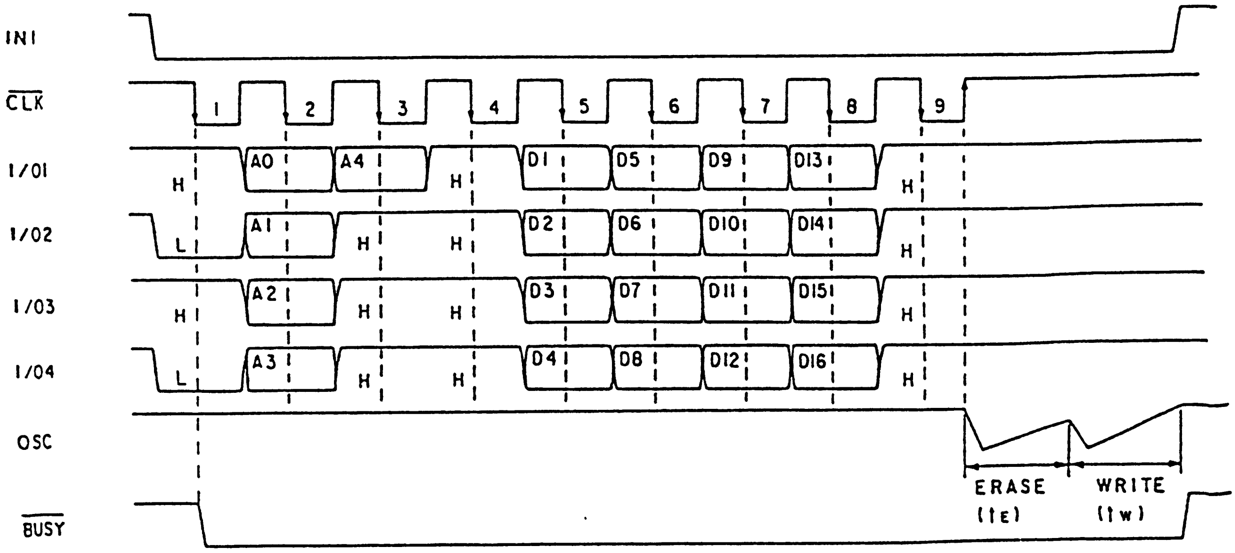

INI
CLK
1 2 3 4 5 6 7 8 9
I/O1
H A0 A4 H D1 D5 D9 D13 H
I/O2
L A1 H H D2 D6 D10 D14 H
I/O3
H A2 H H D3 D7 D11 D15 H
I/O4
L A3 H H D4 D8 D12 D16 H
OSC
ERASE (tE)
WRITE (tW)
BUSY

Fig. 5-6

5-3. System Control

For system control there is control of individual Board, RS232C interface and REMOTE 2 interface.

5-3-1. Interface with the KY-12 Board

Carries out dual-direction communications between the SY-9 Board and the KY-12 Board. If the keys on the main unit or the infrared (wired) remote control are pressed, IC2 of the KY-12 Board judges that and sends the signal to IC1 of the SY-9 Board. After processing at IC1, there is transmission of the display (display section, liquid crystal) command from IC1 of the SY-9 Board to IC2 of the KY-12 Board.
Use is made of the serial communications board of the CPU (IC1: uP78310A).

1) Communications Format..............Serial, non-synchronous communications
2) Bit Format..Start Bit 1, Data 8 bit, Stop Bit 1, No Parity
3) Baud Rate...4800 bps

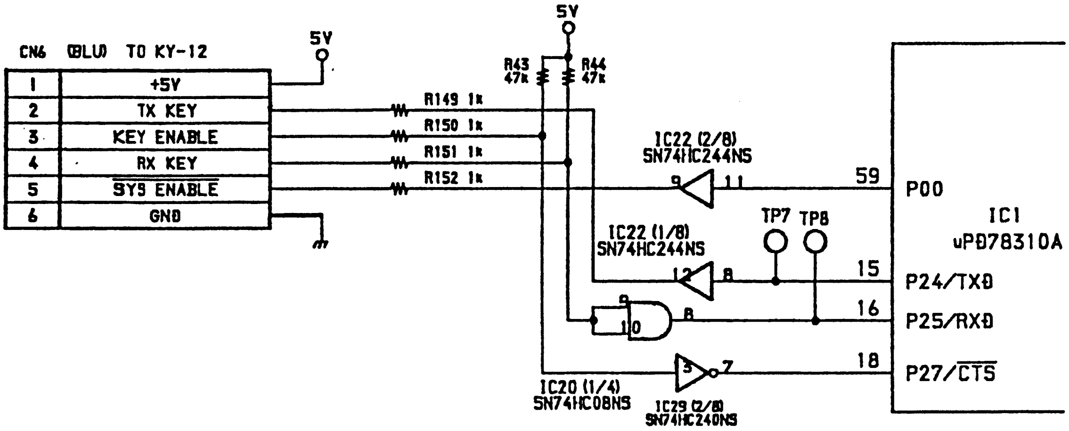

CN6 (BLU) TO KY-12
1 +5V
2 TX KEY
3 KEY ENABLE
4 RX KEY
5 $\overline{\text{SYS ENABLE}}$
6 GND
5V
5V
R43 47k
R44 47k
R149 1k
R150 1k
R151 1k
R152 1k
IC22 (2/8) SN74HC244NS
9
11
59
P00
IC1 uPD78310A
TP7
TP8
IC22 (1/8) SN74HC244NS
12
8
15
P24/TXD
9
10
8
16
P25/RXD
3
7
18
P27/$\overline{\text{CTS}}$
IC20 (1/4) SN74HC08NS
IC29 (2/8) SN74HC240NS

Fig. 5-7

For $\overline{\text{SYS ENABLE}}$, The SY-9 board inhibits and enables communications from the KY-12 Board.

"L" ....Enables communications from the KY-12 Board.
"H" ....Inhibits communications from the KY-12 Board.

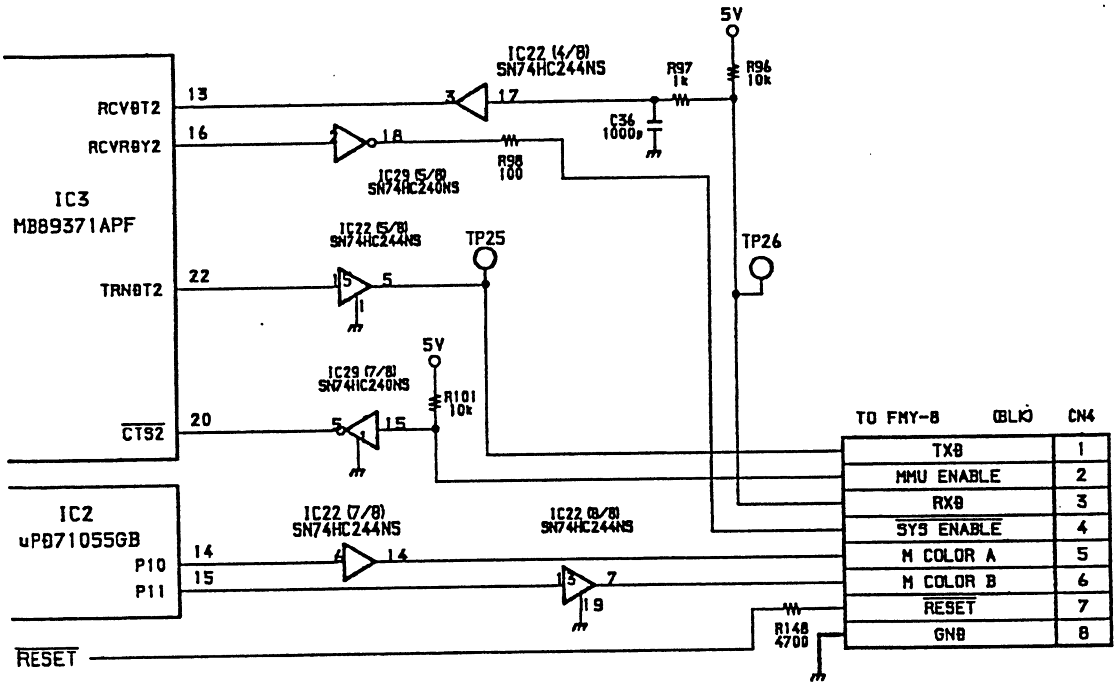
For KEY ENABLE, the KY-12 Board inhibits and enables communications from the SY-9 Board.

"H" ....Enables communications from the SY-9 Board.
"L" ....Inhibits communications from the SY-9 Board.

5-3-2. Interface with the FMY-8 Board

Basically speaking, this is one-way communications from the SY-9 Board to the FMY-8 Board for sending of memory-in and other commands.
The channel from the FMY-8 Board to the SY-9 Board is for expansion.
Uses CH2 of SIO (IC3: MB89371APF).

1) Communication ....Format Serial, non-synchronous communications
2) Bit Format.............................Start Bit 1, Data 8 bit, Stop Bit 1, No Parity
3) Baud Rate..............................4800 bps



5V
IC22 (4/8)
SN74HC244NS
R97
1k
R96
10k
RCV8T2
13
3
17
C36
1000p
RCVR8Y2
16
18
R98
100
IC29 (5/8)
SN74HC240NS
IC3
MB89371APF
IC22 (5/8)
SN74HC244NS
TP25
TP26
TRN8T2
22
15
5
1
5V
IC29 (7/8)
SN74HC240NS
R101
10k
CTS2
20
5
15
TO FMY-8
(BLK)
CN4
TX8
1
MMU ENABLE
2
RX8
3
SYS ENABLE
4
M COLOR A
5
M COLOR B
6
RESET
7
GN8
8
IC2
uPD71055GB
P10
P11
14
15
IC22 (7/8)
SN74HC244NS
6
14
IC22 (8/8)
SN74HC244NS
13
7
19
R148
4700
RESET

Fig. 5-8

For MMU ENABLE, the FMY-8 Board inhibits and enables communications from the SY-9 Board.
"H"...........Enables communications from the SY-9 Board.
"L"............Inhibits communications from the SY-9 Board.

M, COLOR, A, B is a control line. There is supply of information on the color being printed to the masking circuit of the FMY-8 Board.

5-3-3. Interface with the VA-26 Board

These are control signals supplied to the VA-26 Board mainly by means of status.

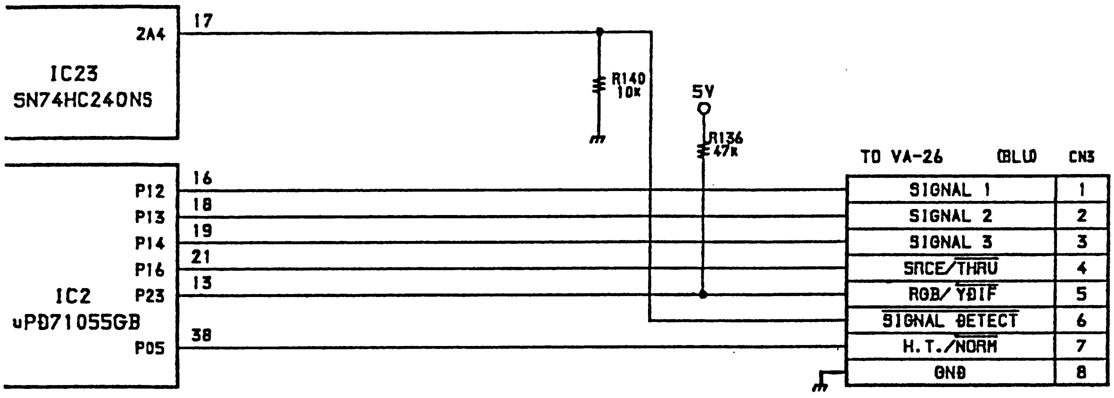

2A4
17
IC23
SN74HC240NS
R140
10K
5V
R136
47K
P12
P13
P14
P16
IC2
P23
uPD71055GB
P05
16
18
19
21
13
38
TO VA-26 (BLU) CN3
SIGNAL 1
SIGNAL 2
SIGNAL 3
SRCE/THRU
RGB/YDIF
SIGNAL DETECT
H.T./NORM
GND
1
2
3
4
5
6
7
8

Fig. 5-9

SIGNAL NAME	I/O	MEANING OF SIGNAL
SIGNAL 1 SIGNAL 2 SIGNAL 3	0	Supplies VIDEO , S-VIDEO, RGB(Y-DIF) input conversion information to the VA-26 board. However, Signal 3 is for system expansion.
SRCE/THRU	0	Switches input screen between E to E and THRU.
RGB/YDIF	I	Switches on back of main unit for changing between RGB and Y-DIF.
SIGNAL DETECT	I	Presence or absence of input signal. No INPUT ="H"
H. T/NORM	0	Changes to halftone when displaying menu.

Table. 5-7

5-3-4. RS232C Interface

After voltage transformation with an RS driver (IC12: SN75188NS and IC13: SN75189ANS), there is use of CH1 of SIO (IC3: MB89371APF).
Includes a special oscillation circuit so that the Baud Rate can be changed.

1) Communications ....Format: Serial, non-synchronous communications
2) Bit Format....................Start Bit 1, Data 8 bit, Stop Bit 1, No Parity
3) Baud Rate.....................1200, 2400, 4800, 9600 bps

5-3-5. REMOTE2 (simple remote control) interface

The $\overline{\text{M IN}}$ singnals are received from the simple remote control and processed and the $\overline{\text{BUSY}}$ singnal is output.

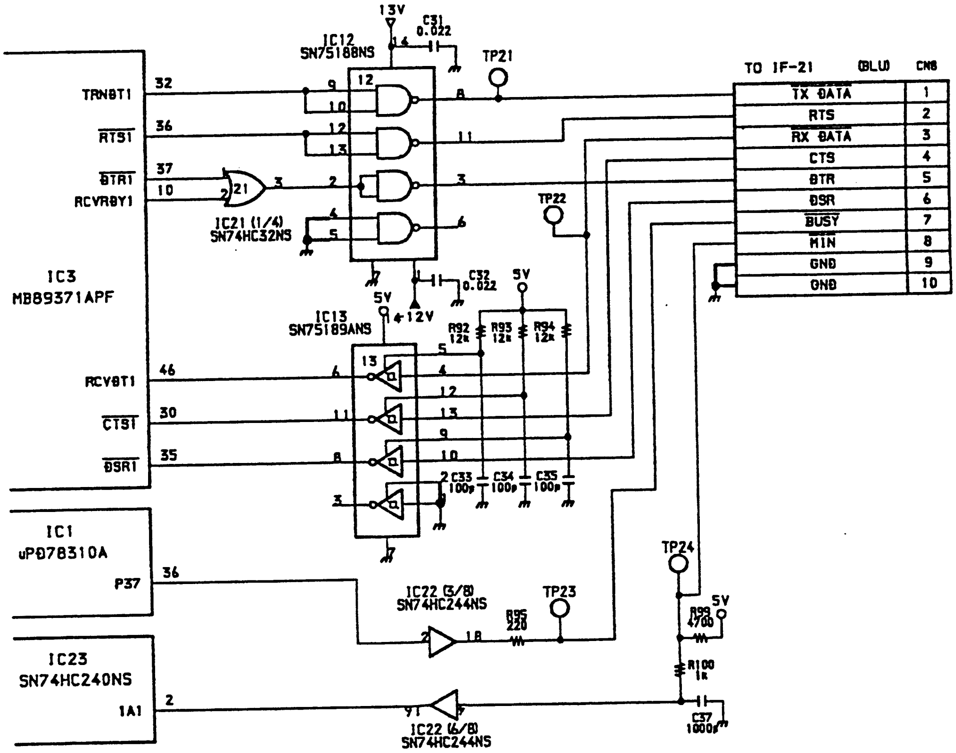

13V
C31 0.022
IC12 SN75188NS
TP21
TO IF-21 (BLU) CN8
TX DATA 1
RTS 2
RX DATA 3
CTS 4
DTR 5
DSR 6
BUSY 7
MIN 8
GND 9
GND 10
TRNDT1 32
RTS1 36
DTR1 37
RCVRDY1 10
IC21 (1/4) SN74HC32NS
IC3 MB89371APF
TP22
C32 0.022
5V
12V
IC13 SN75189ANS
R92 12k
R93 12k
R94 12k
RCVDT1 46
CTS1 30
DSR1 35
C33 100p
C34 100p
C35 100p
IC1 uPD78310A
P37 36
IC22 (3/8) SN74HC244NS
TP23
R95 220
TP24
R99 4700
R100 1k
C37 1000p
IC23 SN74HC240NS
1A1 2
IC22 (6/8) SN74HC244NS

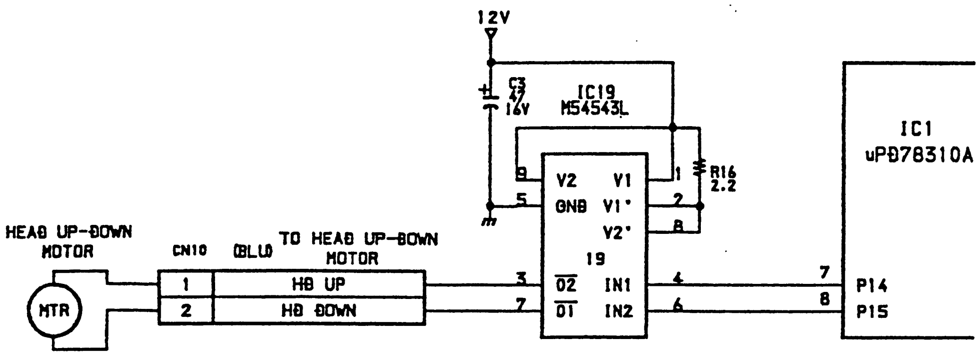
Fig. 5-10

5-4. Mechanism control

Print mechanism operations are controlled with motors and sensors.

5-4-1. Head up/down motor drive circuit

The head is raised and lowered by using the drive IC (IC19: M54543L) to drive a DC motor.



12V
C3
47
16V
IC19
M54543L
IC1
uPD78310A
R16
2.2
HEAD UP-DOWN
MOTOR
MTR
CN10
(BLU)
TO HEAD UP-DOWN
MOTOR
1
2
HD UP
HD DOWN
9
5
3
7
V2
GND
$\overline{02}$
$\overline{01}$
V1
V1'
V2'
19
IN1
IN2
1
2
8
4
6
7
8
P14
P15

Fig. 5-11

INPUT		OUTPUT		OPERATION OF HEAD U/D MOTOR
IN1	IN2	01	02	
L	L	"OFF"	"OFF"	Non-Operation of IC
H	L	H	L	Forward rotation (Head Up)
L	H	L	H	Backward rotation (Head Down)
H	H	L	L	Brake

Table. 5-8 Operation of driver IC (IC19 : M54543L)

5-4-2. Stepping motor drive circuit

The platen and paper feed roller are driven by a stepping motor.
The drive is 2-phase excitation using the CPU (IC1: μPD78310A) software.

- Print time : 358 pps
- Rewind and paper eject time : 2608 pps at maximum speed (high-speed mode)
- Paper feed time : 1067 pps at maximum speed (high-speed mode)

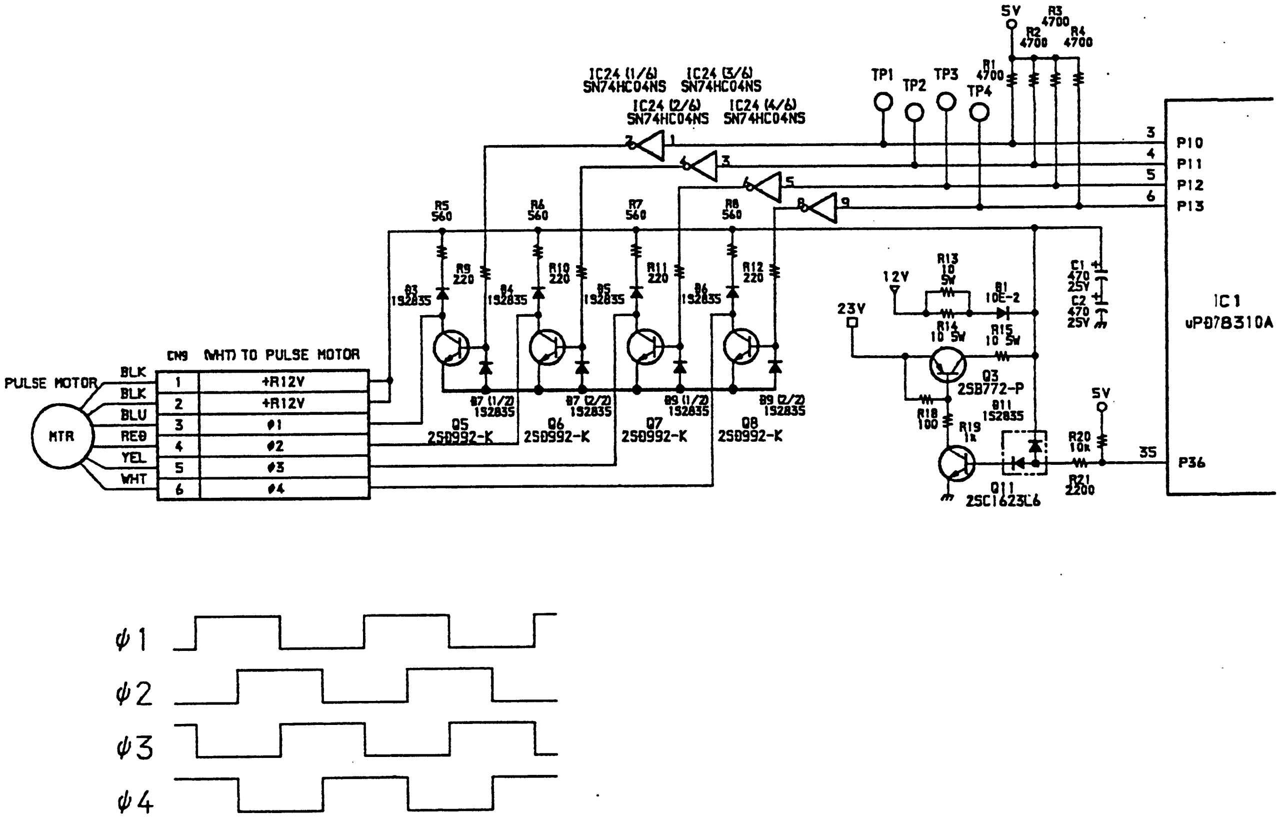

PULSE MOTOR
MTR
BLK
BLK
BLU
REB
YEL
WHT
CN9 (WHT) TO PULSE MOTOR
1 +R12V
2 +R12V
3 ϕ1
4 ϕ2
5 ϕ3
6 ϕ4
IC24 (1/6) SN74HC04NS
IC24 (2/6) SN74HC04NS
IC24 (3/6) SN74HC04NS
IC24 (4/6) SN74HC04NS
R5 560
R6 560
R7 560
R8 560
R9 220
R10 220
R11 220
R12 220
B3 1S2835
B4 1S2835
B5 1S2835
B6 1S2835
B7 (1/2) 1S2835
B7 (2/2) 1S2835
B9 (1/2) 1S2835
B9 (2/2) 1S2835
Q5 2SD992-K
Q6 2SD992-K
Q7 2SD992-K
Q8 2SD992-K
TP1
TP2
TP3
TP4
5V
R1 4700
R2 4700
R3 4700
R4 4700
3
4
5
6
P10
P11
P12
P13
IC1 uPD78310A
12V
23V
R13 10 5W
B1 10E-2
R14 10 5W
R15 10 5W
C1 470 25V
C2 470 25V
Q3 2SB772-P
B11 1S2835
R18 100
R19 1k
Q11 2SC1623L6
5V
R20 10k
R21 2200
35
P36
ϕ1
ϕ2
ϕ3
ϕ4

Fig. 5-12

High-speed mode swithched the stepping motor drive voltage from +12 V to +24 V.

5-4-3. Ribbon motor drive circuit

The ribbon take up is driven by a DC motor. To raise the precision of the ribbon position, a brake circuit is used to improve the ribbon motor stopping. The ribbon feed speed is different for printing and paper positioning. This speed adjustment is determined by the PWM output set by the CPU (IC1: μPD78310A) software.

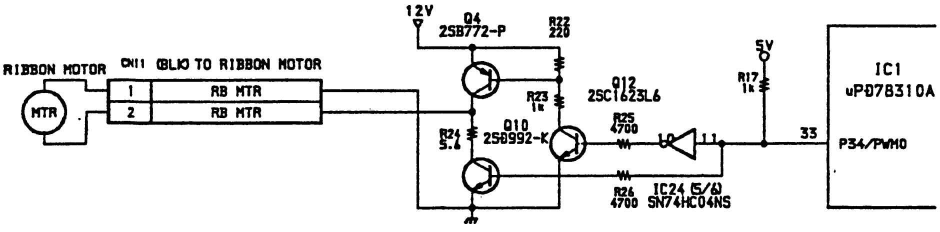

12V
Q4
2SB772-P
R22
220
RIBBON MOTOR
CN11 (BLK) TO RIBBON MOTOR
MTR
1
RB MTR
2
RB MTR
R23
1k
Q12
2SC1623L6
5V
R17
1k
IC1
uPD78310A
R24
5.6
Q10
2SD992-K
R25
4700
10
11
33
P34/PWM0
R26
4700
IC24 (5/6)
SN74HC04NS

Fig. 5-13 Ribbon motor drive circuit

5-4-4. Sensor and Switch Input

CHART	SENSOR NAME	DETECTION METHOD OR OPERATION	DETECTUON LEVEL		SENSOR CIRCUIT OUTPUT	CONNECTOR № & TP №
5-14	P CHECK 1 P CHECK 2	Detects the type of paper and whether there is paper by combined use of two sensors (reflector type sensors).	No paper	H H	←	CN15 TP9, TP10
			Normal paper	H L	←	
			OHP paper	L H	←	
			Reverse side	L L	←	
5-15	TRAY SENSE	Microswitch is ON when feeding tray is inserted.	Tray	L	←	CN16 TP11
			No tray	H	←	
5-16	E JAM PHTR	Judges that there is paper when the light is blocked.	Paper	H	←	CN18 TP12
			No paper	L	←	
5-17	P EDGE PHTR	Judges that there is paper when the light is blocked.	Paper	H	←	CN20 TP13
			No paper	L	←	
5-18	HD POSI PHTR	Judges that the paper has come to position when the light passes.	Position	L	←	CN21 TP14
			Not position	H	←	
5-19	HD HOME POSI PHTR	Judges that the paper has come to home position when the light passes.	Home position	L	←	CN22 TP15
			Not home position	H	←	
5-20	RIBBON CODE PHTR	Judges that the bar code has come when the light is blocked.	Bar code	H	←	CN41 TP6
			No bar code	L	←	
5-21	RIBBON ROT PHTR	There is rotation when the light reflected off a rotating disc with 24 equidistant reflecting surfaces changes.	Rotation		←	CN13 TP5
			No rotation	H or L	←	
5-22	CASETTE SW 0 CASETTE SW 1 CASETTE SW 2 CASETTE SW 3	Depending on how these four switches are pressed, it is possible to judge the type of ribbon in the ribbon cassette and whether there is a ribbon or not.	B & W	L H H H	H L L L	CN7
			OHP	H L H H	L H L L	
			COLOR	H H H H	L L L L	
			L-COLOR	H H H L	L L L H	
			No cassette	L L L L	H H H H	
	S1	When this switch is pressed, the NMI operates and the unit goes to manual mode.	NMI operates on the rise edge.	↓	↓	(Switch in the substrate) S1
	S3	The ribbon motor continues to rotate while the switch is depressed and stops when the switch is released.	Rotating	H	L	(Switch in the substrate) S3
			Stopped	L	H	
	S4	The stepping motor continues to rotate while the switch is depressed and stops when the switch is released.	Rotating	H	L	(Switch in the substrate) S4
			Stopped	L	H	
	S3, S4 (pressed simultaneously)	When the switches are depressed, move to the next head position among the four possible head positions.	Goes to next head position and stops.	H H	L L	(Switch in the substrate) S3, S4
			Stops	L L	H H	

Table. 5-9

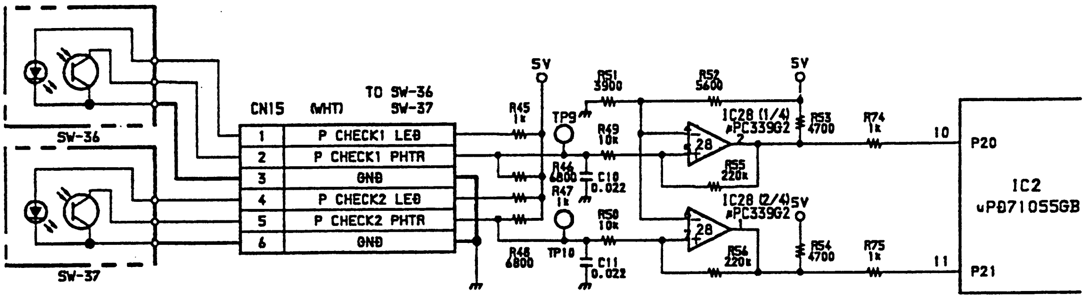

SW-36
SW-37
CN15
(WHT)
TO SW-36
SW-37
1
P CHECK1 LED
2
P CHECK1 PHTR
3
GND
4
P CHECK2 LED
5
P CHECK2 PHTR
6
GND
5V
R45
1k
TP9
R46
6800
R47
1k
R48
6800
TP10
R49
10k
R50
10k
C10
0.022
C11
0.022
R51
3900
R52
5600
IC28 (1/4)
µPC339G2
IC28 (2/4)
µPC339G2
28
R55
220k
R56
220k
5V
R53
4700
R54
4700
R74
1k
R75
1k
10
11
P20
P21
IC2
uPD71055GB

Fig. 5-14

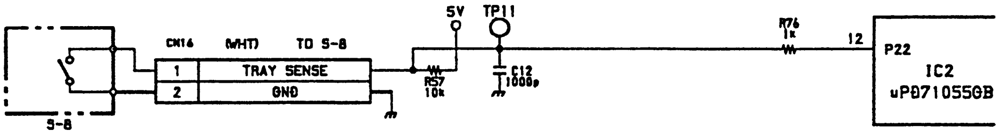

S-8
CN16
(WHT)
TO S-8
1
TRAY SENSE
2
GND
5V
TP11
R57
10k
C12
1000p
R76
1k
12
P22
IC2
uPD71055GB

Fig. 5-15

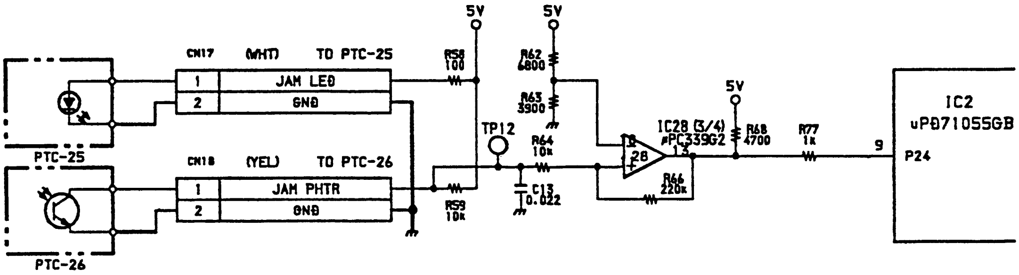

PTC-25
PTC-26
CN17
(WHT)
TO PTC-25
1
JAM LED
2
GND
CN18
(YEL)
TO PTC-26
1
JAM PHTR
2
GND
5V
5V
R58
100
R59
10k
R62
6800
R63
3900
TP12
R64
10k
C13
0.022
IC28 (3/4)
µPC339G2
28
R66
220k
5V
R68
4700
R77
1k
9
P24
IC2
uPD71055GB

Fig. 5-16

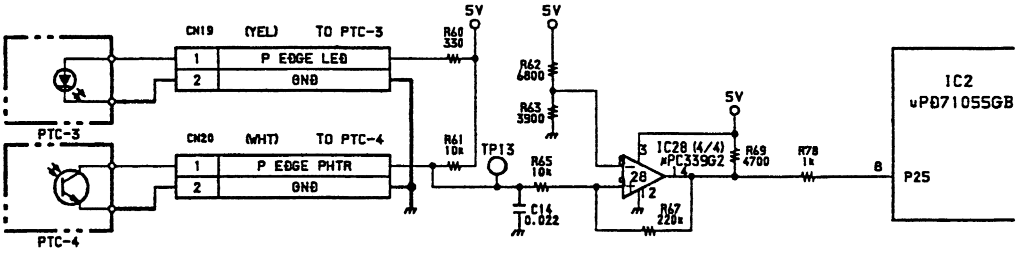

PTC-3
PTC-4
CN19
(YEL)
TO PTC-3
1
P EDGE LED
2
GND
CN20
(WHT)
TO PTC-4
1
P EDGE PHTR
2
GND
5V
5V
R60
330
R61
10k
R62
6800
R63
3900
TP13
R65
10k
C14
0.022
IC28 (4/4)
µPC339G2
28
R67
220k
5V
R69
4700
R78
1k
8
P25
IC2
uPD71055GB

Fig. 5-17

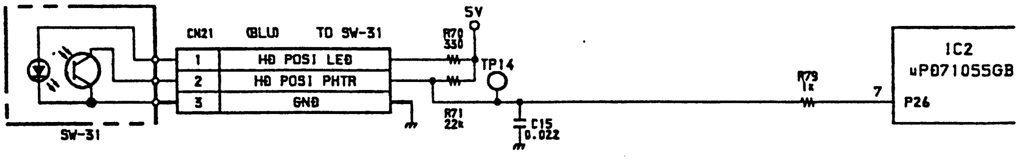

SW-31
CN21
(BLU)
TO SW-31
1
HD POSI LED
2
HD POSI PHTR
3
GND
5V
R70
330
TP14
R71
22k
C15
0.022
R79
1k
7
P26
IC2
uPD71055GB

Fig. 5-18

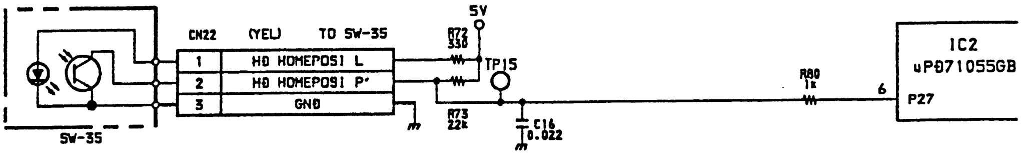

SW-35
CN22
(YEL)
TO SW-35
1
HD HOMEPOSI L
2
HD HOMEPOSI P'
3
GND
5V
R72
330
TP15
R73
22k
C16
0.022
R80
1k
6
IC2
uPD71055GB
P27

Fig. 5-19

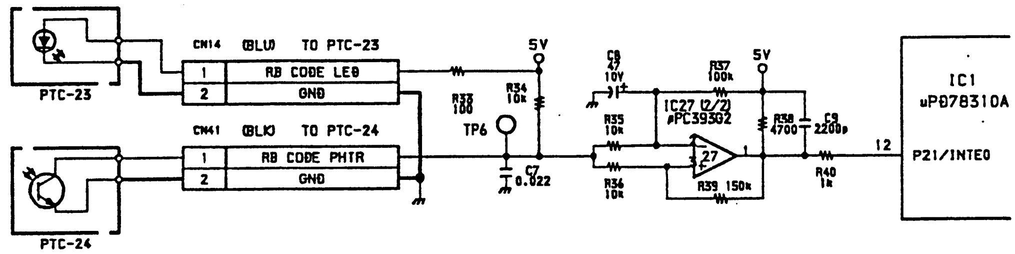

PTC-23
PTC-24
CN14
(BLU)
TO PTC-23
1
RB CODE LED
2
GND
CN41
(BLK)
TO PTC-24
1
RB CODE PHTR
2
GND
5V
R33
100
R34
10k
TP6
C7
0.022
C8
47
10V
R35
10k
R36
10k
IC27 (2/2)
μPC393G2
27
R37
100k
5V
R38
4700
C9
2200p
R39 150k
R40
1k
12
IC1
uPD78310A
P21/INTE0

Fig. 5-20

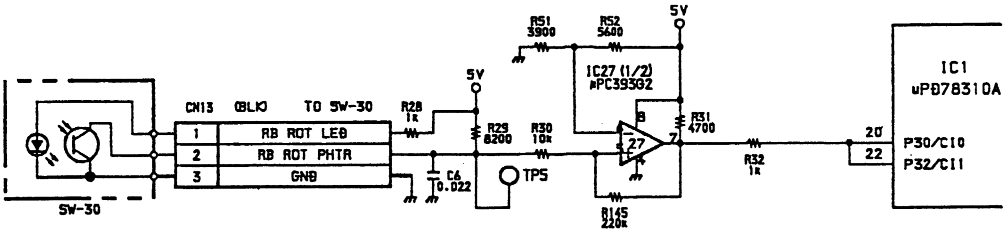

SW-30
CN13
(BLK)
TO SW-30
1
RB ROT LED
2
RB ROT PHTR
3
GND
R28
1k
5V
R29
8200
R30
10k
C6
0.022
TP5
R51
3900
R52
5600
5V
IC27 (1/2)
μPC393G2
27
R31
4700
R145
220k
R32
1k
20
22
IC1
uPD78310A
P30/CI0
P32/CI1

Fig. 5-21

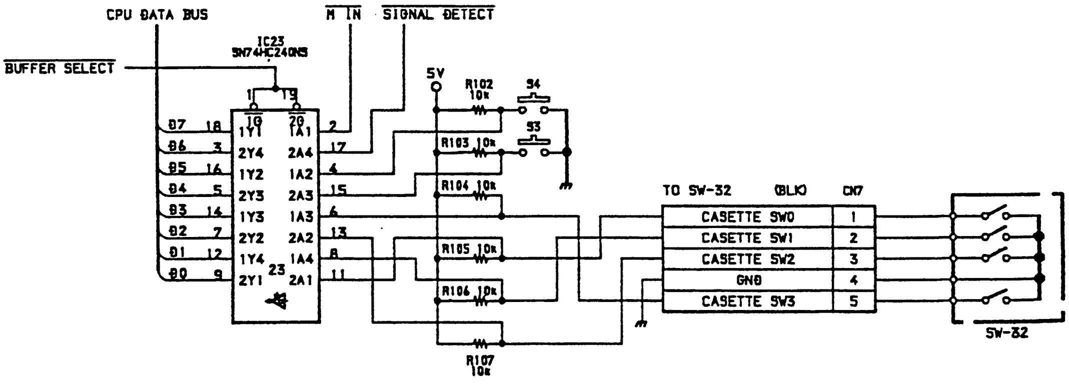

CPU DATA BUS
M IN
SIGNAL DETECT
BUFFER SELECT
IC23
SN74HC240NS
1G
2G
1Y1
2Y4
1Y2
2Y3
1Y3
2Y2
1Y4
2Y1
1A1
2A4
1A2
2A3
1A3
2A2
1A4
2A1
23
D7
D6
D5
D4
D3
D2
D1
D0
5V
R102
10k
S4
R103 10k
S3
R104 10k
R105 10k
R106 10k
R107
10k
TO SW-32
(BLK)
CN7
CASETTE SW0
CASETTE SW1
CASETTE SW2
GND
CASETTE SW3
1
2
3
4
5
SW-32

Fig. 5-22

5-5. Head control

The head control section is a circuit that applies various correction and other processing to the print data sent from the FMY-8 board and sends the resulting data to the thermal head to be printed.

5-5-1. γ Compensation circuit

The print data sent from the FMY-8 board is γcompensated with the data conversion table in the γROM (IC5: HN27C101AP).

2 bits for color switching, 2 bits for ribbon type, 4 bits for the thermal head temperature compensation, and 1 bit for laminating and preheating are allocated in the γROM address. Different γ data is selected according to the signals from the CPU (IC1: μPD78310A).

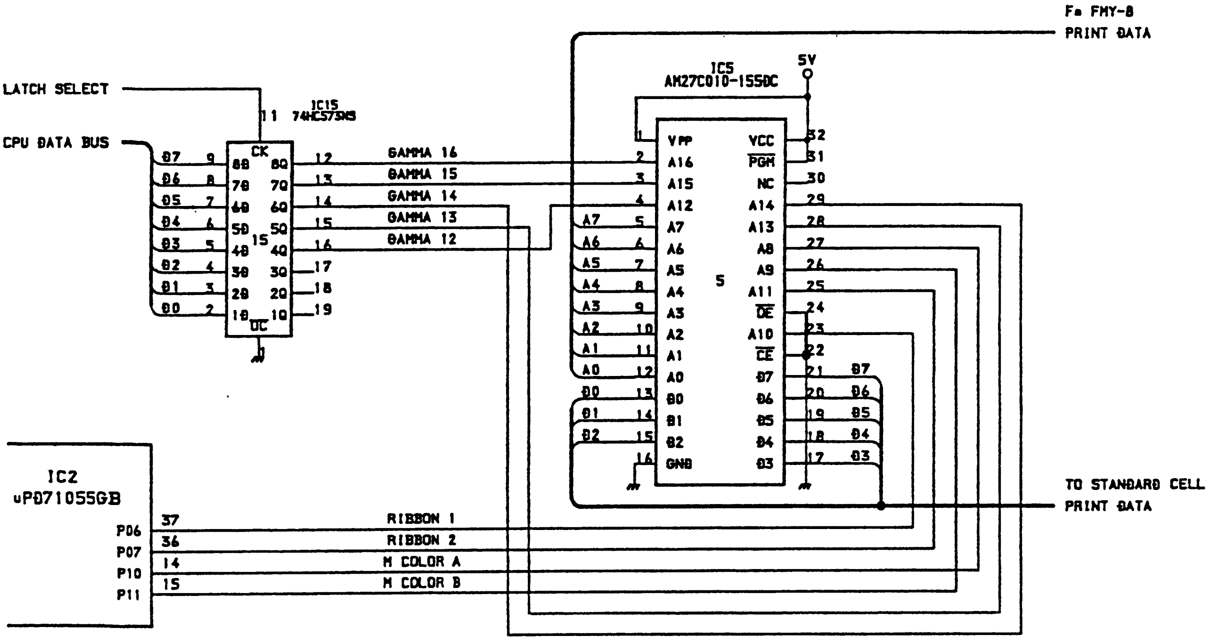

Fm FMY-8
PRINT DATA
LATCH SELECT
CPU DATA BUS
IC15
74HC573
IC5
AM27C010-155DC
5V
GAMMA 16
GAMMA 15
GAMMA 14
GAMMA 13
GAMMA 12
VPP
A16
A15
A12
A7
A6
A5
A4
A3
A2
A1
A0
D0
D1
D2
GND
VCC
PGM
NC
A14
A13
A8
A9
A11
OE
A10
CE
D7
D6
D5
D4
D3
IC2
uPD71055GB
P06
P07
P10
P11
RIBBON 1
RIBBON 2
M COLOR A
M COLOR B
TO STANDARD CELL
PRINT DATA

Fig. 5-23

5-5-2. Standared cell

The head control standard cell (IC11: HDC443V2) applies the next signal processing to the γ compensated print data, finally the data is pulse width modulated and sent to the thermal head.

1) Interpolation processing

During field printing, improve quality, other fields are interpolated wiath an interpolation techniqure that uses pattern recognition.

2) Edge emphasis processing

Horizontal and vertical FIR digital filters emphasize the edges to raise the image clarity.

3) Rising correction

A horizontal IIR digital filter is used to correct the dulling of the rise caused by poor head thermal response.

4) Line count correction

The head element voltage is corrected by controlling the conductance duration.

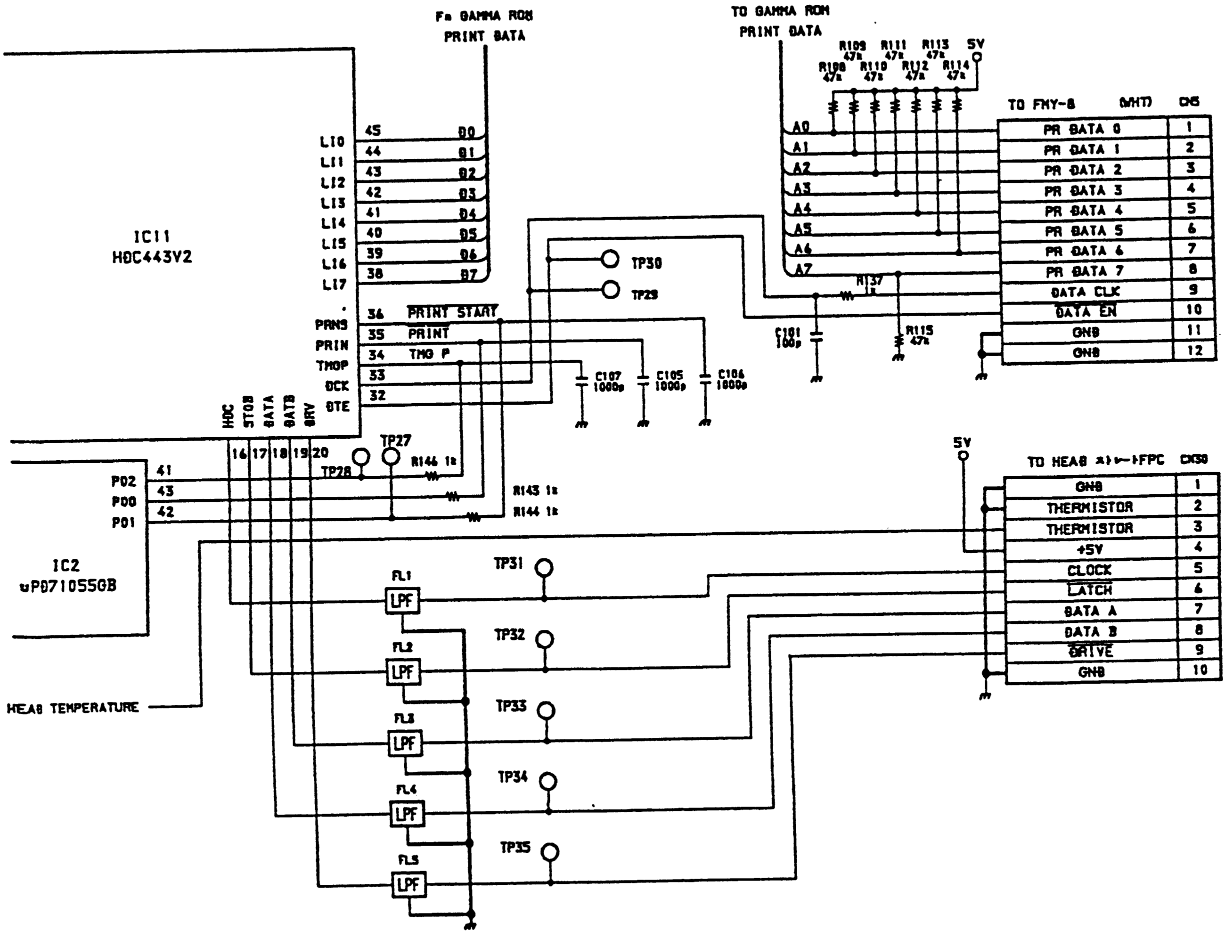

Fm GAMMA ROM
PRINT DATA
TO GAMMA ROM
PRINT DATA
IC11
HDC443V2
LI0
LI1
LI2
LI3
LI4
LI5
LI6
LI7
45
44
43
42
41
40
39
38
D0
D1
D2
D3
D4
D5
D6
D7
PRNS
PRIN
TMGP
DCK
DTE
36
35
34
33
32
PRINT START
PRINT
TMG P
TP30
TP29
C107 1000p
C105 1000p
C106 1000p
HDC
STOB
DATA
DATB
DRV
16
17
18
19
20
TP27
TP28
R146 1k
R143 1k
R144 1k
R108 47k
R109 47k
R110 47k
R111 47k
R112 47k
R113 47k
R114 47k
5V
A0
A1
A2
A3
A4
A5
A6
A7
R137
C101 100p
R115 47k
TO FMY-8 (WHT) CN5
PR DATA 0 1
PR DATA 1 2
PR DATA 2 3
PR DATA 3 4
PR DATA 4 5
PR DATA 5 6
PR DATA 6 7
PR DATA 7 8
DATA CLK 9
DATA EN 10
GND 11
GND 12
IC2
uPD71055GB
P02
P00
P01
41
43
42
HEAD TEMPERATURE
FL1
FL2
FL3
FL4
FL5
LPF
TP31
TP32
TP33
TP34
TP35
5V
TO HEAD ストレートFPC CN30
GND 1
THERMISTOR 2
THERMISTOR 3
+5V 4
CLOCK 5
LATCH 6
DATA A 7
DATA B 8
DRIVE 9
GND 10

Fig. 5-24

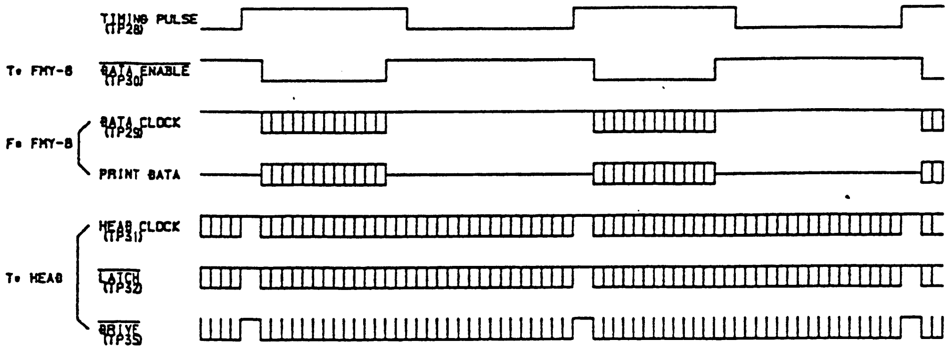

TIMING PULSE (TP28)
To FMY-8
DATA ENABLE (TP30)
Fm FMY-8
DATA CLOCK (TP29)
PRINT DATA
To HEAD
HEAD CLOCK (TP31)
LATCH (TP32)
DRIVE (TP35)

Fig. 5-25 Standard Cell Input/Output Timing

When the CPU sets $\overline{\text{PRINT}}$ and $\overline{\text{PRINT START}}$ "Low", the standard cell can print and the printing of one line start's at the rising edge the timing pulse. At the rising edge of the timing pulse, the standard cell sets $\overline{\text{DATA ENABLE}}$ "Low" and the data clock and the print data synchronized to it are sent from the FMY-8 board. First, the print data is stored into external SRAM (IC7: CXK5814P), then external SRAM (IC8: CXK5814P) and four internal SRAMs are used for arithmetic processeing. The resulting print data is pulse width modulated sychronized with the rising edge of two timing pulses later and the serial print data, shift clock, latch, and drive signals are sent to the thermal head.

5-5-3. V CONT Circuit

For temperature correction there is change in the V CONT voltage to change the power source voltage of the head.
The thermistor (TH1) on the Board and the thermistor on the thermal head are used to detect the temperature inside the unit and the temperature on the head and to output the V CONT voltage via the operation amp circuit. The head power source is used to drive the stepping motor. Because high voltage is required during the high speed mode, Q1 and Q2 are used to change the V CONT voltage.

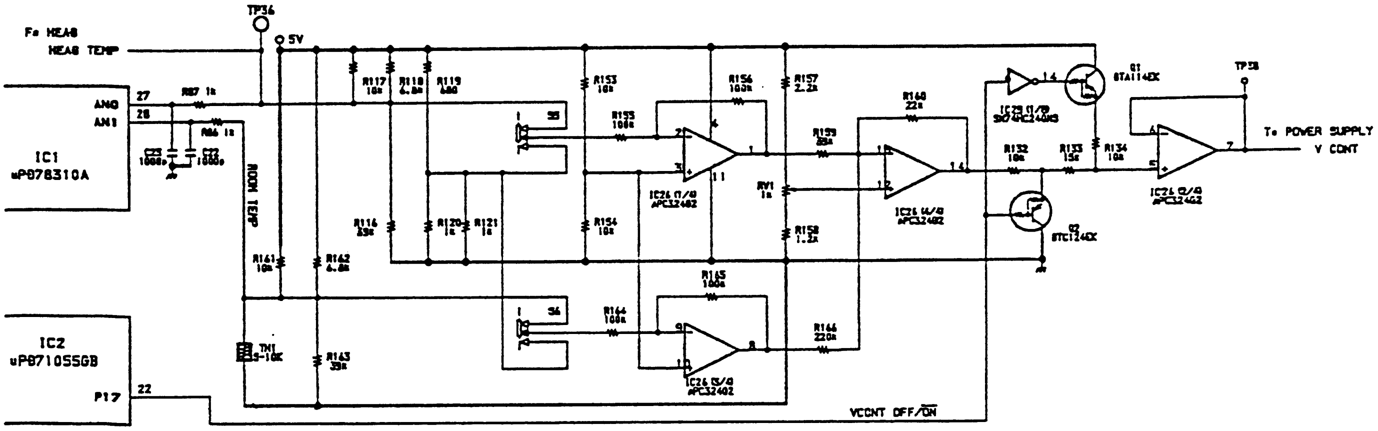

TP36
Fm HEAD
HEAD TEMP
5V
AN0
AN1
27
28
R87 1k
R86 1k
C23 1000p
C22 1000p
IC1
uP878310A
ROOM TEMP
R117 10k
R118 6.8k
R119 680
R116 33k
R120 1k
R121 1k
R161 10k
R162 6.8k
R163 33k
TH1
IC2
uP871055GB
P17
22
S5
S6
R153 10k
R154 10k
R155 100k
R156 100k
R157 2.2k
R158 1.2k
RV1 1k
R159 33k
R160 22k
R164 100k
R165 100k
R166 220k
IC26 (1/4) uPC324G2
IC26 (4/4) uPC324G2
IC26 (3/4) uPC324G2
IC26 (2/4) uPC324G2
IC28 (1/6)
Q1
DTA114EK
Q2
DTC124EK
R132 10k
R133 15k
R134 10k
TP38
To POWER SUPPLY
V CONT
VCONT OFF/$\overline{\text{ON}}$

Fig. 5-26

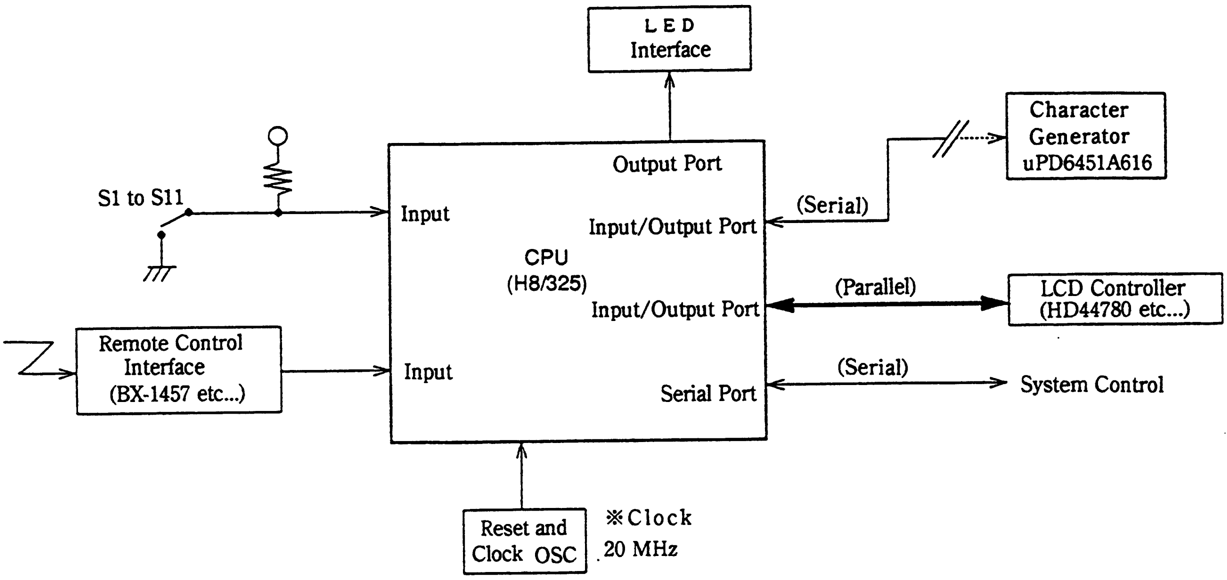
Also, the voltage of the two thermistors is input to the A/D conversion port of CPU and this is used to choose between pre-heat function and the temperature compensation γ by means of software.

6. INTERFACE SYSTEM (KY-12 BOARD)

6-1. General

The KY-12 Board mainly has the following functions, receipt of keys from the main unit, alarm (LED), print (LED), liquid crystal and displays and receipt of signals from the remote control. Control signals from system control of the SY-9 Board are received and controlled by the key control circuit (CPU).
The KY-12 Board is composed as shown in the following block diagram with the H8/325 single chip microcomputer acting as the center.

1) Key input interface
2) Remote control input interface
3) System control serial communications interface
4) Control display control serial communications interface
5) LCD control parallel interface



LED Interface
Character Generator uPD6451A616
S1 to S11
Output Port
Input
(Serial)
Input/Output Port
CPU (H8/325)
(Parallel)
LCD Controller (HD44780 etc...)
Input/Output Port
Remote Control Interface (BX-1457 etc...)
Input
(Serial)
Serial Port
System Control
Reset and Clock OSC
※Clock 20 MHz

Fig. 6-1

6-2. KEY Input Interface

The CPU ports corresponding to the keys are constantly pulled up by the power source. When the key is pressed the port level goes to LOW. Key input is composed of the 11 switches S1 to S11. They are divided into the keys that can be operated independently (direct) and keys that are operated while viewing the menu screen (menu-related).

KEY			FUNCTION
DIRECT	S 1	SOURCE/MEMORY	Switching of monitor signal.
	S 2	MEMORY PAGE	Switching of memory page.
	S 9	STOP	Stop of printing.
	S10	PRINT	Start of printing.
	S11	MEMORY IN	Inclusion of input signal in memory.
MENU	S 3	CURSOR [RIGHT]	Moves the cursor to the right..
	S 4	MENU	Summonsing menu screen, returning to former menu.
	S 5	EXECUTE	Execution of operations displayed on menu.
	S 6	CURSOR [LEFT]	Moves the cursor to the left.
	S 7	CURSOR [DOWN]	Moves the cursor down.
	S 8	CURSOR [UP]	Moves the cursor up.

Table. 6-1

In addition, there is double strike of keys for a number of special uses.

KEY		FUNCTION
Pressing two keys simultaneously	S 3 + S 6	Forced standardization of color adjustment value. Moves spilit position to original position.
	S 9 + S 1 1 & power source ON	Moves to test mode (serviceman mode).
	S 1 + S 9	Moves from test mode to communications mode.

Table. 6-2

6-3. Remote Control Input Interface

The interface is so composed that it can respond to wired or wireless commands. By inserting the output plug of the remote control in the 3.5 dia-meter minijack input, an SIRCS signal is input from the Pin 1 of CN5 for response to the wired commander. By removing the output plug from the remote control, the Pin 1 and 2 of CN5 are shorted so that an SIRC signal from IC4 is input and the system responds to the wireless remote control. Regarding IC4, at the light receiving section of the infrared remote control there is integration of a 480 kHz signal intermittently sent from remote control and this is converted into a 16 bit signal.

6-4. System Control Serial Communications Interface

For serial communications between KEY control (KY-12 Board) and system control (SY-9 Board) there is use of a non-synchronous serial communications used by the RS-232C and other devices.

Communications specifications

Communications format	Non-synchronous serial communications
Communications speed	4800 bps
Start bit	1 bit
Data	8 bit
Stop bit	1 bit
Parity	No parity
Communications direction	Bi-directional (by means of a control line)
Communications level	TTL level

6-5. CRT screen display control serial communications interface

In order to output menu characters and general display characters onto the moniter screen in addition to the video data, the CRT screen character display controller, IC2 (μPD6451AGT-006), is used. The interface format for the μPD6451 is synchronous serial transfer, so the IC2 input/output is used and the four singnals required by the CRT screen character display controller are created.

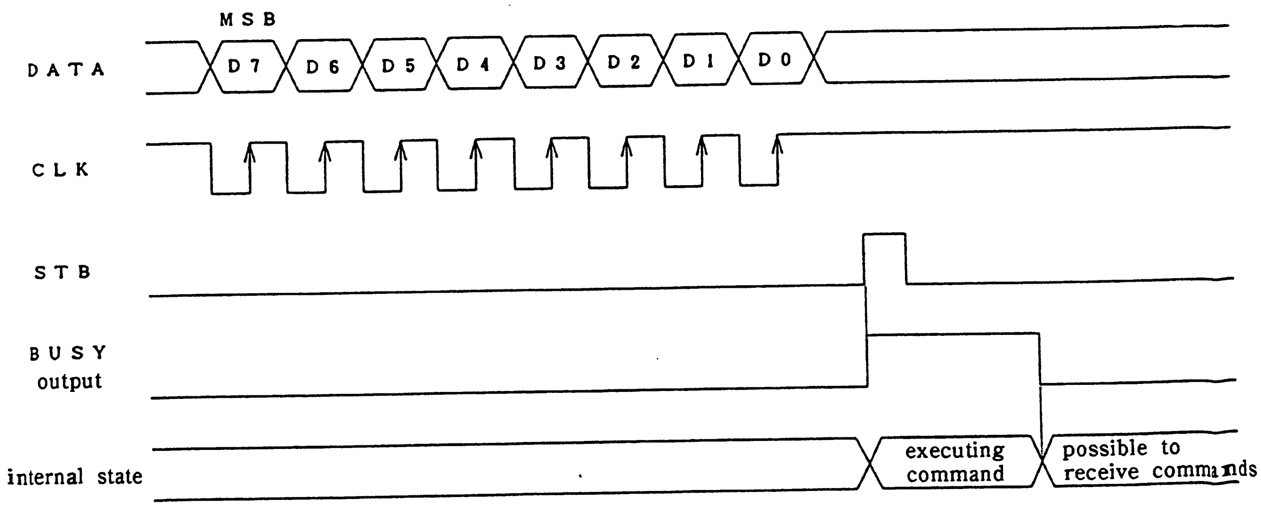


Fig. 6-2

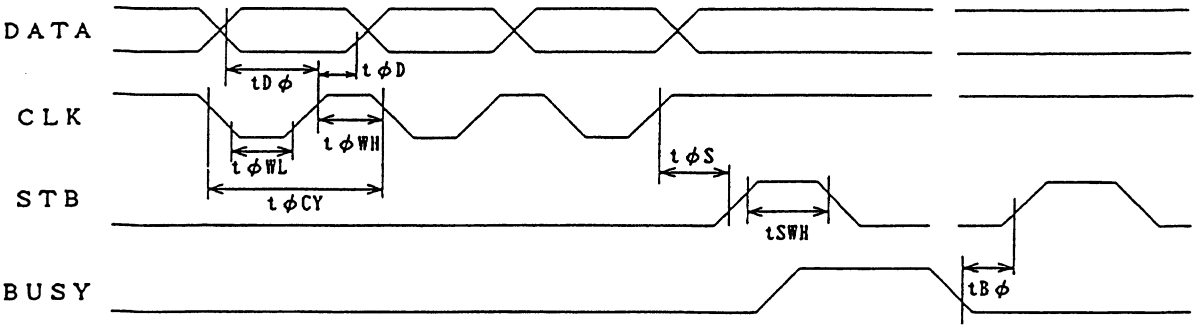

DATA
CLK
STB
BUSY
tD φ
t φ D
t φ WL
t φ WH
t φ CY
t φ S
tSWH
tB φ

Fig. 6-3

ITEM	ABBREVIATION	MIN	MAX	UNIT
Minimum setup time	$t_D \phi$	200	–	n sec
Minimum hold time	$t \phi_D$	200	–	n sec
Minimum clock low level width	$t \phi_{WL}$	700	–	n sec
Minimum clock high level width	$t \phi_{WH}$	700	–	n sec
Minimum clock-strobe time	$t \phi_S$	400	–	n sec
Minimum strobe high level width	$t \phi_{SWH}$	1	–	μ sec
Clock cycle	$t \phi_{CY}$	1.6	–	μ sec
Minimum pin-strobe time	$t_B \phi$	100	–	μ sec

Table. 6-3

6-6. LCD control parallel interface

An LCD module with an HD44780 LCD controller is used to display menu characters and general display characters.
The HD44780 LCD module control driver uses parallel data transfer including control signals and uses the IC2 input/output port for connection with the control driver.

MOVEMENT OF WRITE

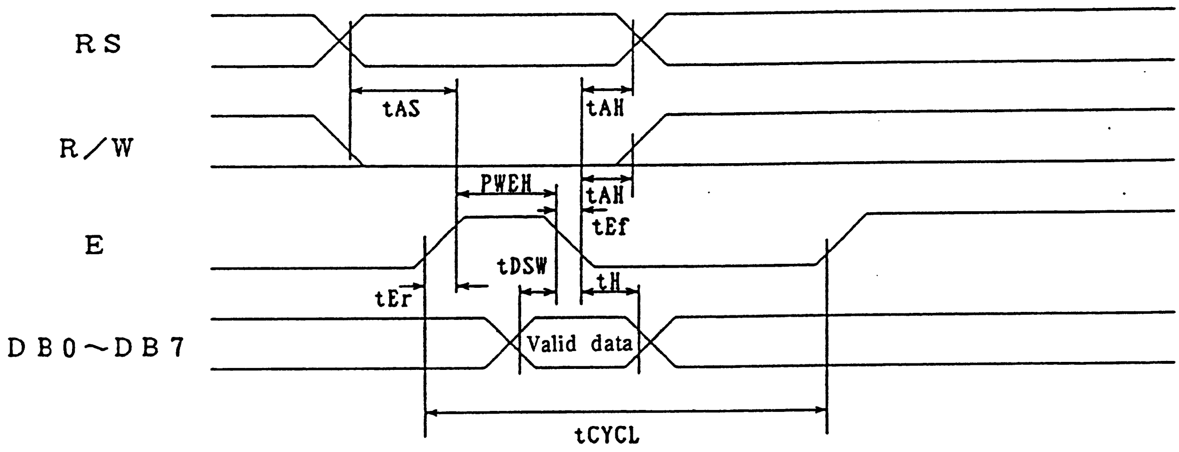


Fig. 6-4

ITEM		ABBREVIATION	MIN	MAX	UNIT
Enable pulse width	"High" level	PW_{EH}	450	–	n sec
Enable cycle time		t_{CYCL}	1000	–	n sec
Enable rise, fall time		t_{Er} · t_{Ef}	–	25	n sec
Set up time	RS, R/W-E	t_{AS}	140	–	n sec
Address hold time		t_{AH}	10	–	n sec
Data setup time		t_{DSW}	195	–	n sec
Data hold time		t_{H}	10	–	n sec

Table. 6-4

6-7. CPU (H8/325) port map

TERMINAL	SIGNAL NAME	I/O	FUNCTION
1	XTAL		Connect clock oscillator. 20 MHz
2	EXTAL		
3	MD$_1$	I	Operational mode control terminal.
4	MD$_0$	I	Mode 3 : MD$_0$ = 1, MD$_1$ = 1
5	(NMI)	(I)	
6	Vcc		+5 V
7	(STBY)	(I)	
8	Vss		GND
9			
10			
11			
12			
13			
14	RIGHT KEY	I	Key input signal
15	MEMORY PAGE KEY	I	Key input signal
16	SOURCE/MEMORY KEY	I	Key input signal
17	TXD (CRT)	O	Display section IC data signal
18	STB (CRT)	O	Display section IC strobe signal
19	CLK (CRT)	O	Display section display IC clock signal
20	TXD (SY)	O	Transmission data signal to system control
21	RXD (SY)	I	Receipt data signal from system control
22			
23	MEMORY IN KEY	I	Key input signal
24	PRINT KEY	I	Key input signal
25	STOP KEY	I	Key input signal
26	UP KEY	I	Key input signal
27	DOWN KEY	I	Key input signal
28	LEFT KEY	I	Key input signal
29	EXECUTE KEY	I	Key input signal
30	MENU KEY	I	Key input signal
31	Vcc		+5 V
32	PRINT (LED)	O	Printing indicator: On when LED output signal is 1
33	ALARM (LED)	O	Alarm indicator: On when led output signal is 1
34			
35			
36			
37	LCD ENABLE	O	Data read/write start signal(Active = 1)
38			
39	$\overline{\text{LCD WR}}$	O	Data read/write selection signal
40	Vss		GND
41			
42	LCD V$_0$ − 0	O	LC drive power supply DA Bit 0
43	LCD V$_0$ − 1	O	LC drive power supply DA Bit 1
44	LCD V$_0$ − 2	O	LC drive power supply DA Bit 2
45			
46			
47			
48	LCD RS	O	Register selection signal
49	LCD DB$_0$	O	Data Bus 0
50	LCD DB$_1$	O	Data Bus 1
51	LCD DB$_2$	O	Data Bus 2
52	LCD DB$_3$	O	Data Bus 3
53	LCD DB$_4$	O	Data Bus 4
54	LCD DB$_5$	O	Data Bus 5
55	LCD DB$_6$	O	Data Bus 6
56	LCD DB$_7$	O	Data Bus 7
57	SY ENABLE	I	SY serial communications enable
58	KY ENABLE	O	KY serial communications enable
59			
60	SIRCS SIGNAL	I	Remote control input signal
61	SIRCS SIGNAL(IRQ$_0$)	I	
62	BUSY	I	CRT screen display IC busy signal
63			
64	ESET	I	CPU reset input

Table. 6-5

SONY

SONY - SP0167

COLOR VIDEO PRINTER

UP-5100SERIES

SERVICE MANUAL

SUPPLEMENT-1

Please add and replace your manual with this SUPPLEMENT-1.

SUBJECT

- THEORY OF OPERATION

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1. ANALOG VIDEO SYSTEM (IF-19, VA-26, DSC-8 and DSC-9 Boards)

1-1. General

Analog system video is composed of the following, An IF-19 Board with a video/interface function, VA-26 Board with a video signal input processing and output processing function, DSC-8 and DSC-9 Boards for volume control (see Fig.1-1).

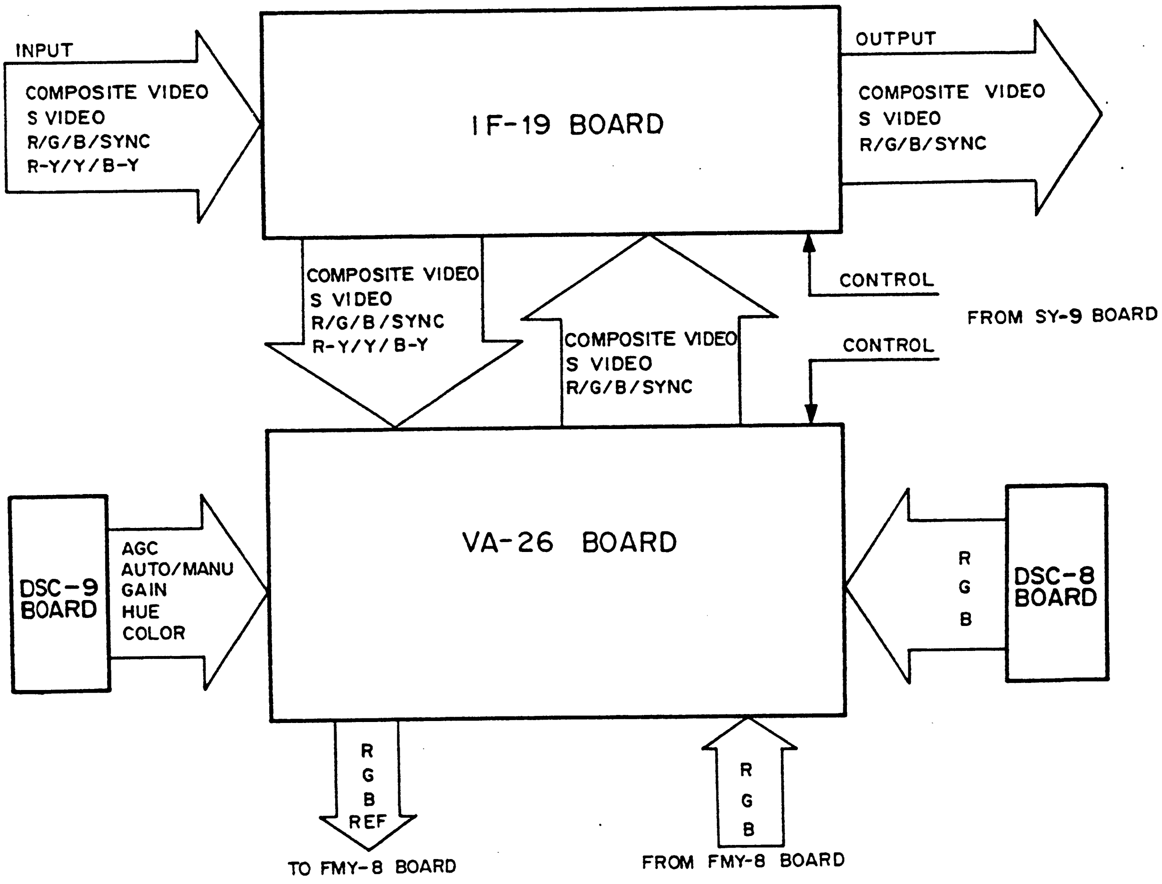

INPUT
COMPOSITE VIDEO
S VIDEO
R/G/B/SYNC
R-Y/Y/B-Y
IF-19 BOARD
OUTPUT
COMPOSITE VIDEO
S VIDEO
R/G/B/SYNC
COMPOSITE VIDEO
S VIDEO
R/G/B/SYNC
R-Y/Y/B-Y
COMPOSITE VIDEO
S VIDEO
R/G/B/SYNC
CONTROL
FROM SY-9 BOARD
CONTROL
DSC-9 BOARD
AGC
AUTO/MANU
GAIN
HUE
COLOR
VA-26 BOARD
R
G
B
DSC-8 BOARD
R
G
B
REF
TO FMY-8 BOARD
R
G
B
FROM FMY-8 BOARD

Fig. 1-1

1-2. IF-19 Board

The IF-19 Board consists of the three blocks shown below, and in order to respond to each video signal, includes the seven circuits shown in Figure 1-2 [COMPOSITE VIDEO, C(S VIDEO), Y(S VIDEO), R, G, B, SYNC].

1) 6dB AMP Block
2) SWITCHER Block
3) 75 Ω DRIVER Block

The video signals input to the IF-19 Board from the outside are terminated by 75 Ω. This signal passes through a buffer after which one part goes to the INPUT circuit of the VA-26 Board and the other part is input to the 6 dB AMP. The signal which is doubled at the 6dB AMP is input to the SWITCHER.
The other input to the SWITCHER is the signal that has passed through the output processing system of the VA-26 Board.
The SWITCHER is changed to the THRU or E to E mode by means of the CONTROL signal from the SY-9 Board. SWITCHER OUT of the THRU mode outputs the signal that has passed through the 6 dB AMP. SWITCHER OUT of the E to E mode outputs the signal that has passed through output processing of the VA-26 Board.
The signal that is output from the SWITCHER passes through the 75 Ω DRIVER and is then output.

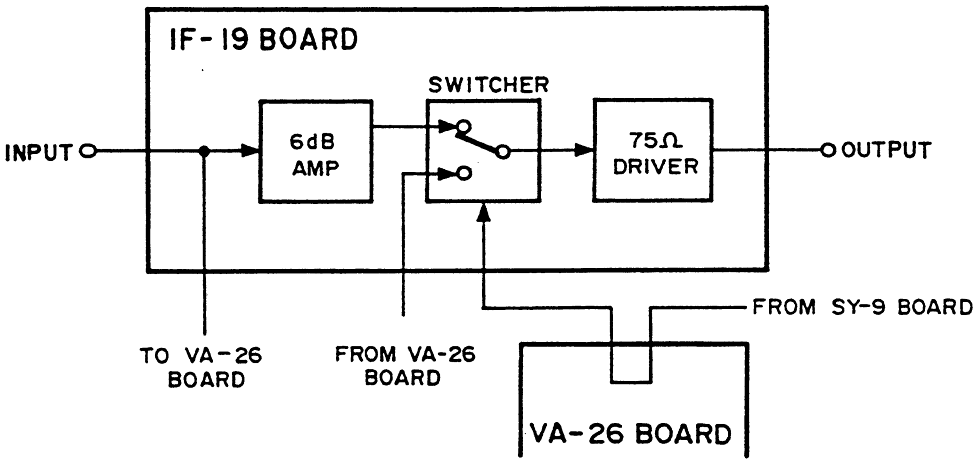


Fig. 1-2

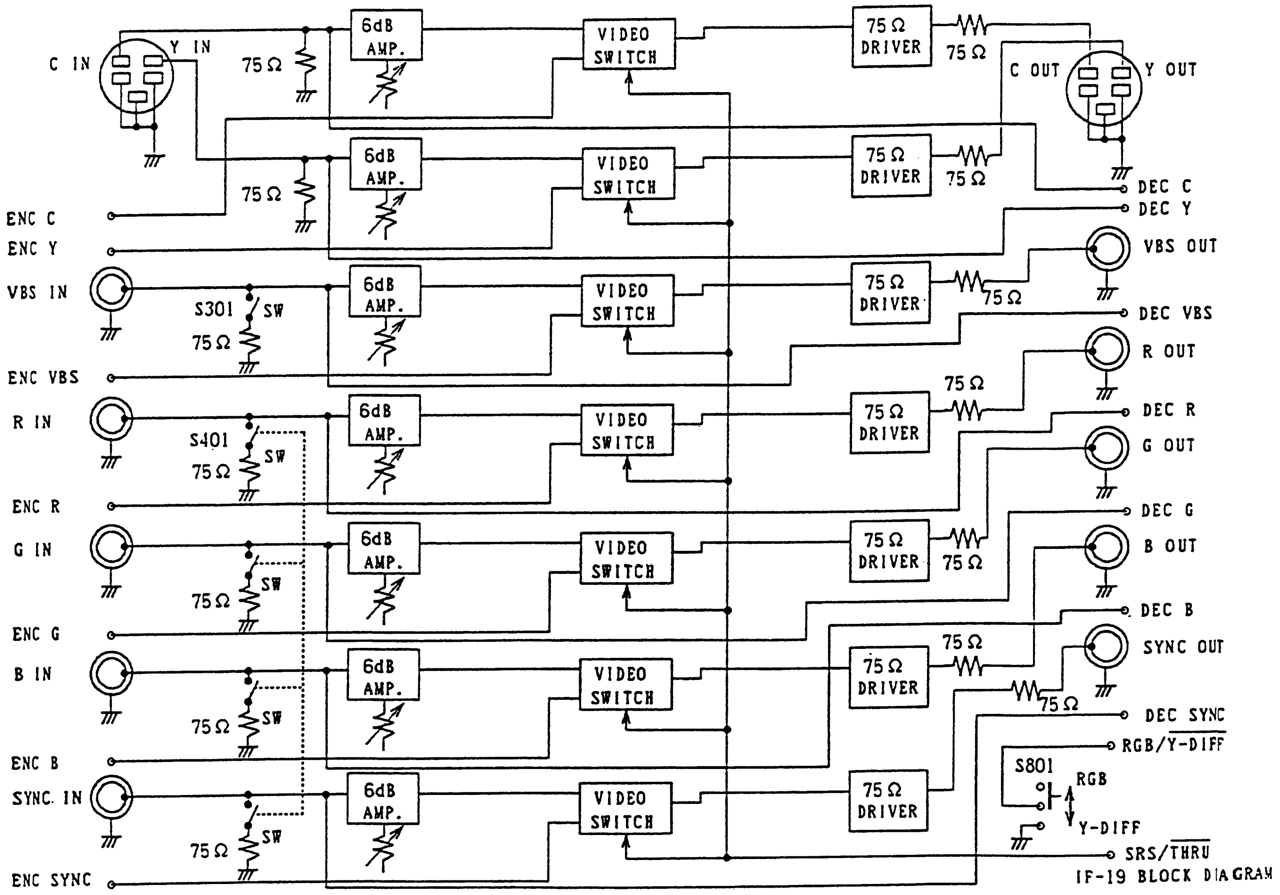

C IN
Y IN
75 Ω
6dB AMP.
VIDEO SWITCH
75 Ω DRIVER
C OUT
Y OUT
DEC C
DEC Y
ENC C
ENC Y
VBS IN
S301
SW
VBS OUT
DEC VBS
ENC VBS
R IN
S401
R OUT
DEC R
G OUT
ENC R
G IN
DEC G
B OUT
ENC G
DEC B
B IN
SYNC OUT
DEC SYNC
RGB/Y-DIFF
S801
RGB
Y-DIFF
ENC B
SYNC. IN
SRS/THRU
IF-19 BLOCK DIAGRAM
ENC SYNC

Fig. 1-3 IF-19 Board Block Diagram

2. VIDEO SYNC SIGNAL (VA-26BOARD)

2-1. General

The processing system for synchronous signals is composed of the following contents.

1) Synchronous signal selection circuit
2) SYNC/SEP circuit
3) CLAMP PULSE generation circuit
4) VD separation circuit
5) H BLANKING circuit
6) V BLANKING circuit
7) AFC circuit
8) INT SYNC generation circuit
9) INT/EXT changing circuit
10) BF generation circuit

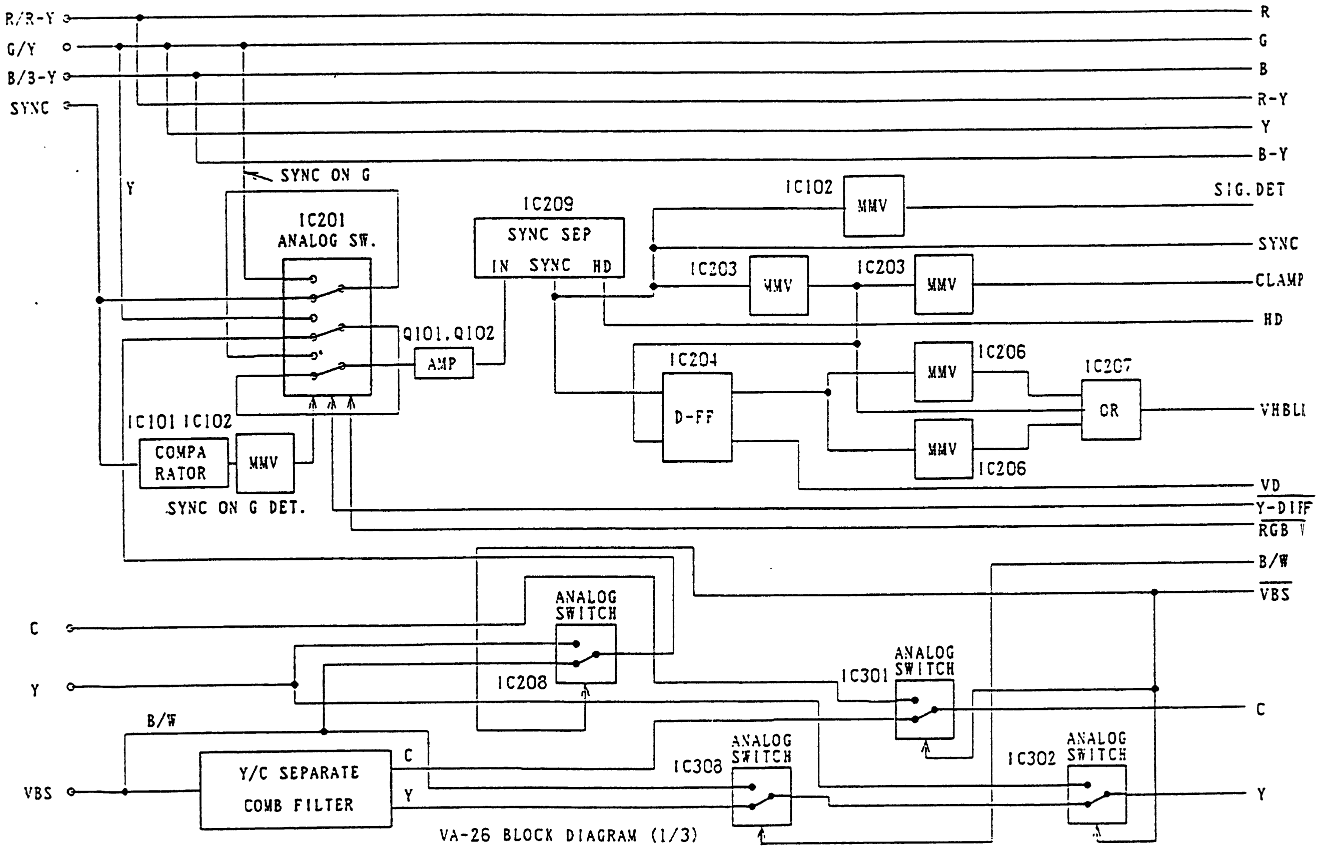

R/R-Y
G/Y
B/B-Y
SYNC
R
G
B
R-Y
Y
B-Y
SYNC ON G
Y
IC201
ANALOG SW.
IC209
SYNC SEP
IN SYNC HD
IC102
MMV
SIG.DET
SYNC
IC203
MMV
IC203
MMV
CLAMP
HD
Q101.Q102
AMP
IC204
D-FF
IC206
MMV
IC207
OR
VHBLK
MMV
IC206
VD
Y-DIFF
RGB V
B/W
VBS
IC101 IC102
COMPARATOR
MMV
SYNC ON G DET.
C
Y
B/W
VBS
ANALOG SWITCH
IC208
ANALOG SWITCH
IC301
Y/C SEPARATE
COMB FILTER
C
Y
ANALOG SWITCH
IC308
ANALOG SWITCH
IC302
C
Y
VA-26 BLOCK DIAGRAM (1/3)

Fig. 2-1 VA-26 Board Block Diagram (1/3)

2-2. Sync Signal Selection Circuit

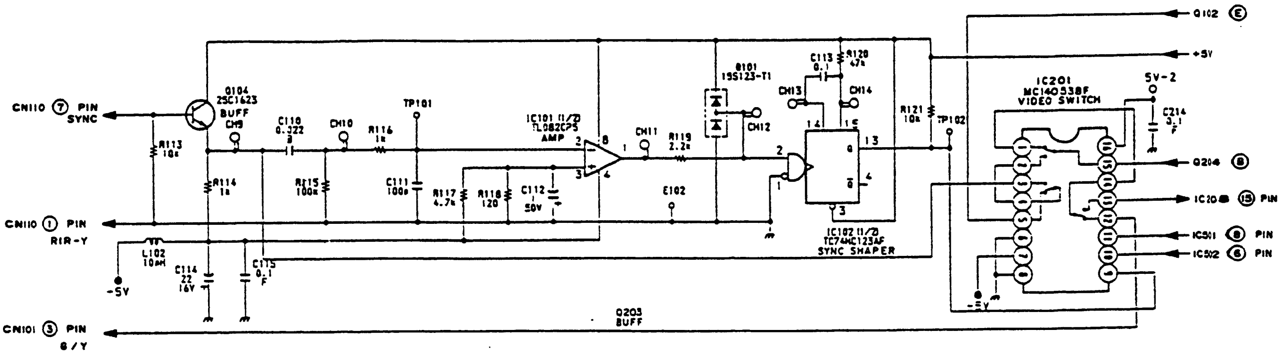
Synchronous signal selection is carried out with the analog switch of IC201.
The video signals that have been selected according to the mode of the individual video signals are sent to the SYNC/SEP BLOCK.

• SYNC automatic detection of RGB component signal.

There are the two types of that when the RGB component signals include signals in which the SYNC is independent, and signals in which the SYNC has been added to the G signal (SYNC on G).
In the VA-26 Board, viewing the SYNC of the RGB signal input from the Pin 7 of CN101 is used to determine whether it is SYNC on G.

• SYNC on G DET Block (IC101, IC102)

The SYNC signal from the Pin 7 of CN101 undergoes CD cut and is input to MINUS INPUT terminal of the Pin 2 of comparator IC101.
The threshold is set at approximately -0.12V. When the SYNC signal Pin 3 of IC101 is input, the IC101 output Pin 1 of IC101 generates a pulse according to the SYNC cycle. This pulse is input to the Pin 1 of the re-trigger mono/multi IC102. As long as the pulse is input with an H cycle, the Pin 13 of IC102 is maintained at HIGH.
The Pin 13 of IC102 is connected to the control terminal Pin 9 of IC201. At this time, IC201 selects SYNC as a synchronous signal. During SYNC on G, the Pin 7 of CN101 has no signal input and the Pin 13 of IC102 goes to LOW. IC201 selects the G signal as a synchronous signal.



CN110 ⑦ PIN SYNC
CN110 ① PIN RIR-Y
CN101 ③ PIN G/Y
-5V
Q104 2SC1623 BUFF
CH9
R113 10k
R114 1k
C110 0.022
CH10
R115 100k
R116 1k
TP101
C111 100p
R117 4.7k
R118 120
C112 1 50V
L102 10μH
C114 22 16V
C115 0.1 F
IC101 (1/2) TL082CPS AMP
CH11
R119 2.2k
E102
Q203 BUFF
D101 1SS123-T1
CH12
CH13
CH14
C113 0.1
R120 47k
IC102 (1/2) TC74HC123AF SYNC SHAPER
R121 10k
TP102
IC201 MC14053BF VIDEO SWITCH
5V-2
C214 0.1 F
-5V
Q102 Ⓔ
+5V
Q204 Ⓑ
IC208 ⑮ PIN
IC501 ⑧ PIN
IC502 ⑥ PIN

Fig. 2-2 Sync signal selection circuit

2-3. SYNC/SEP Circuit

The video signal selected by analog switch IC201 is output from the Pin 15. It is amplified 1.5 times in the Q201 and Q202 AMP circuits.
The amplified signal undergoes SYNC TIP CLAMP in D201. It passes through a 3.58 MHz trap consisting of R216, L203, C216 and C217 and is input to the Pin 1 of SYNC/SEP IC209. The signal that is input to the Pin 1 of IC209 undergoes SYNC/SEP. There is then output of a positive polarity COMPOSITE SYNC from the Pin 4 and output of a positive polarity HD signal from the Pin 8 after passing half H killer.

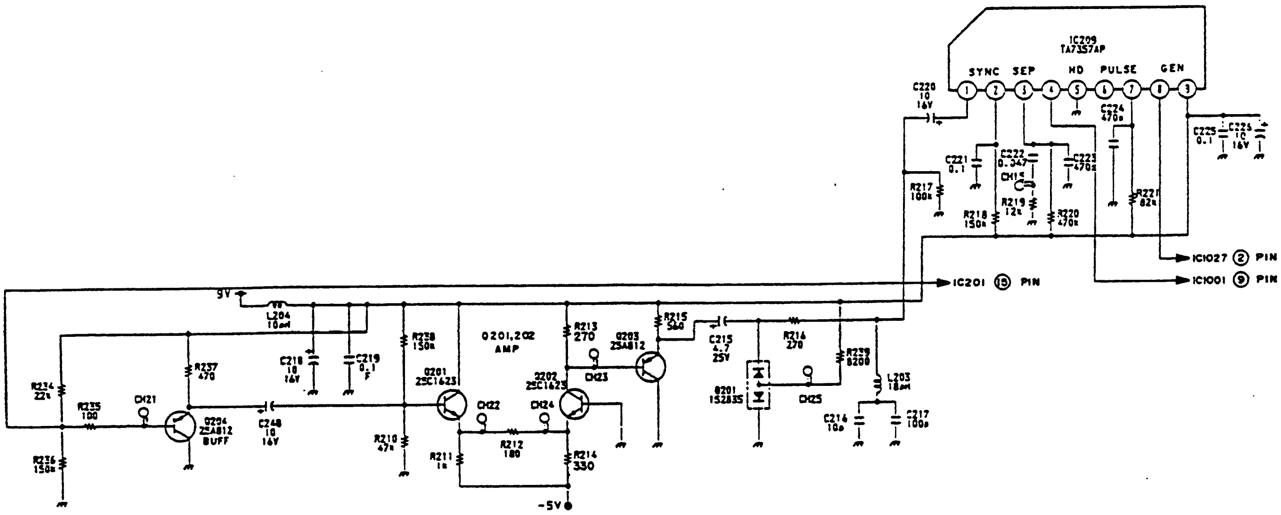

IC209
TA7357AP
SYNC SEP HD PULSE GEN
C220 10 16V
C221 0.1
C222 0.047
CH15
C223 470p
C224 470p
C225 0.1
C226 10 16V
R217 100k
R218 150k
R219 12k
R220 470k
R221 82k
IC1027 ② PIN
IC1001 ⑨ PIN
IC201 ⑮ PIN
9V
L204 10μH
C218 10 16V
C219 0.1 F
R238 150k
Q201,202 AMP
R213 270
Q203 2SA812
R215 560
C215 4.7 25V
R216 270
R239 8200
L203 18μH
D201 1S2835
CH25
C216 10p
C217 100p
R234 22k
R235 100
CH21
R237 470
Q204 2SA812 BUFF
C248 10 16V
R236 150k
Q201 2SC1623
Q202 2SC1623
CH22
CH23
CH24
R210 47k
R211 1k
R212 180
R214 330
-5V

Fig. 2-3 SYNC/SEP Circuit

2-4. VD Separation Circuit

The COMPOSITE SYNC that has undergone SYNC/SEP is input to the Pin 2 of IC203. It is simultaneously input to the Pin 2 of IC204.
The signal is output from the Pin 4 of IC203 and this is input to the clock of the Pin 3 of IC204. A negative polarity V SYNC is separated from the Pin 6 of IC204 and is output.

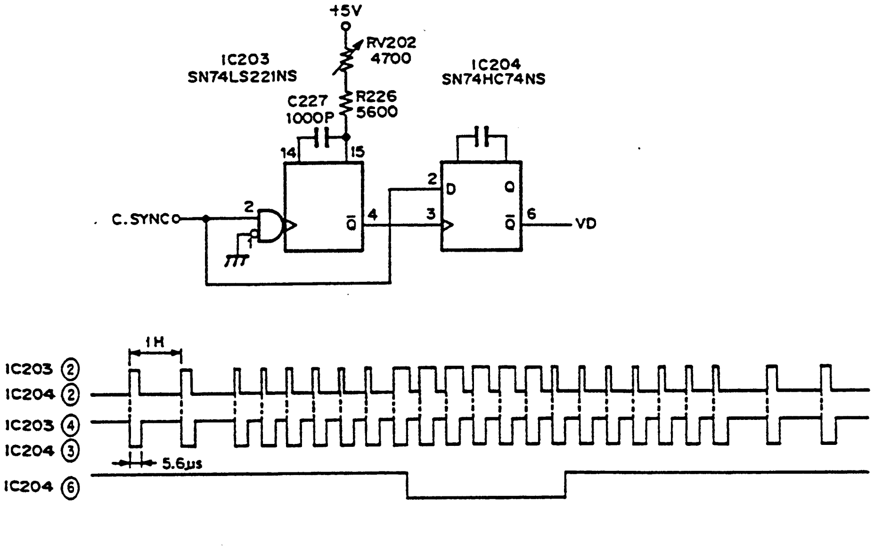

+5V
RV202 4700
IC203 SN74LS221NS
IC204 SN74HC74NS
C227 1000P
R226 5600
14
15
2
4
C.SYNC
2
D
Q
3
Q̄
6
VD
1H
IC203 ②
IC204 ②
IC203 ④
IC204 ③
5.6μs
IC204 ⑥

Fig. 2-4 VD Separation Circuit

2-5. CLAMP PULSE Generation Circuit

The Pin 13 output of IC203, which has been increased to 5.6 μsec, is input to the Pin 9 of IC203. A negative polarity CLAMP PULSE is obtained from the output of the Pin 12. This signal is inverted at Q33 to operate the individual CLAMP transistors.
In addition, because there is MISCLAMP during the V SYNC interval, VD is input to the Pin 11 CLR of IC203 so that the CLAMP PULSE is stopped during this interval.

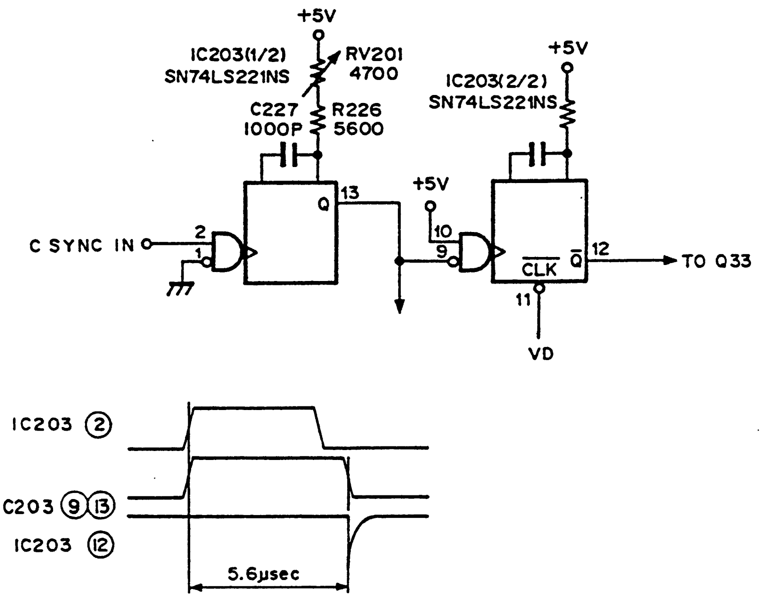

+5V
IC203(1/2)
SN74LS221NS
RV201
4700
C227
1000P
R226
5600
+5V
IC203(2/2)
SN74LS221NS
+5V
Q
13
C SYNC IN
2
1
10
9
CLK
$\overline{Q}$
12
TO Q33
11
VD
IC203 ②
IC203 ⑨⑬
IC203 ⑫
5.6μsec

Fig. 2-5 CLAMP PULSE Generation Circuit

2-6. H Blanking Circuit

The H Blanking pulse determines the position of the CLAMP PULSE. It uses the output pulse of the Pin 13 of IC203.

2-7. V Blanking Circuit

The V Blanking pulse creates a positive polarity VD from the Pin 5 of IC204 for the Pin 4 and Pin 11 of IC206. At IC206 the output is returned to input and this is used as non-retriggable M.M.V.

A pulse that is approximately 6H from the rise of VD is output from the Pin 6 of IC206. A pulse equal to approximately 7 H until the fall of VD is output from the Pin 9 of IC206. (A pulse equal to approximately 255 H from the fall of VD is output from the Pin 10). The output from the Pin 9 of IC206 is input to the Pin 9 of IC207. And is output from the Pin 8 of IC207.

This V Blanking pulse is input to the Pin 5 of IC207. The above-mentioned H circuit pulse is input to the Pin 4 of IC207. The V.H circuit pulse is output from the Pin 6 of IC207 and is then input to the control switch terminals of the Pins 9, 10, 11 of the analog switch IC7. The blanking section is changed so that it is the same DC level as the pedestal.

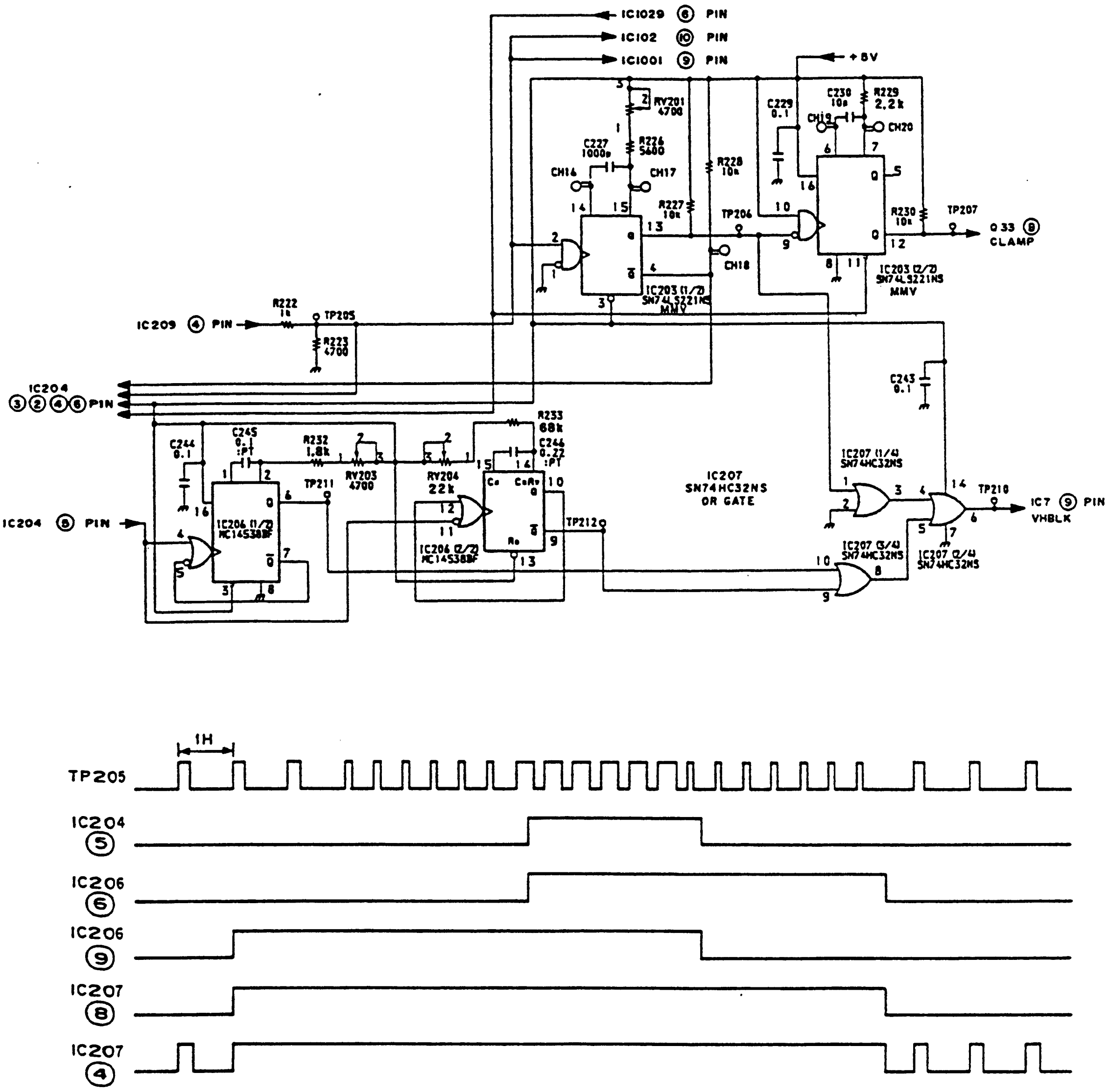

IC1029 ⑥ PIN
IC102 ⑩ PIN
IC1001 ⑨ PIN
+8V
RV201 4700
C227 1000p
R226 5600
CH16
CH17
R228 10k
R227 10k
TP206
CH18
C229 0.1
C230 10u
R229 2.2k
CH19
CH20
R230 10k
TP207
Q33 ⑧ CLAMP
IC203 (1/2) SN74LS221NS MMV
IC203 (2/2) SN74LS221NS MMV
IC209 ④ PIN
R222 1k
TP205
R223 4700
IC204 ③②④⑥ PIN
C243 0.1
C244 0.1
C245 0.1 :PT
R232 1.8k
RV203 4700
TP211
RV204 22k
R233 68k
C246 0.22 :PT
IC204 ⑤ PIN
IC206 (1/2) MC14538BF
IC206 (2/2) MC14538BF
TP212
IC207 SN74HC32NS OR GATE
IC207 (1/4) SN74HC32NS
IC207 (2/4) SN74HC32NS
IC207 (3/4) SN74HC32NS
TP210
IC7 ⑨ PIN VHBLK
1H
TP205
IC204 ⑤
IC206 ⑥
IC206 ⑨
IC207 ⑧
IC207 ④

Fig. 2-6 V Blanking Circuit

2-8. AFC Circuit

An HD signal which has undergone half-H killer is output from the Pin 8 of the IC209, the IC for SYNC/SEP.

The HD signal is input to the mono/multi Pin 2 of IC1027. A sample pulse is generated and is input to the Pin 6 of IC1026, the hybrid IC of the phase comparator. The error voltage is output from the Pin 1 of IC1026. It passes through the error amp IC1142 comprising the LPF and is impressed to the varicap (D1002). This is used to change VCO which emits 4 fsc.

The VCO output is output from the Q1043 emitter and is input to the Pin 2 of the 910 division phase comparator composed of the IC1023, IC1024 and IC1025 counters.

The HD signal locked in this PLL circuit is input to the Pin 9 of the mono/multi IC1027 where the pulse width becomes approximately 5μsec and the signal is input to the INT/EXT changing circuit.

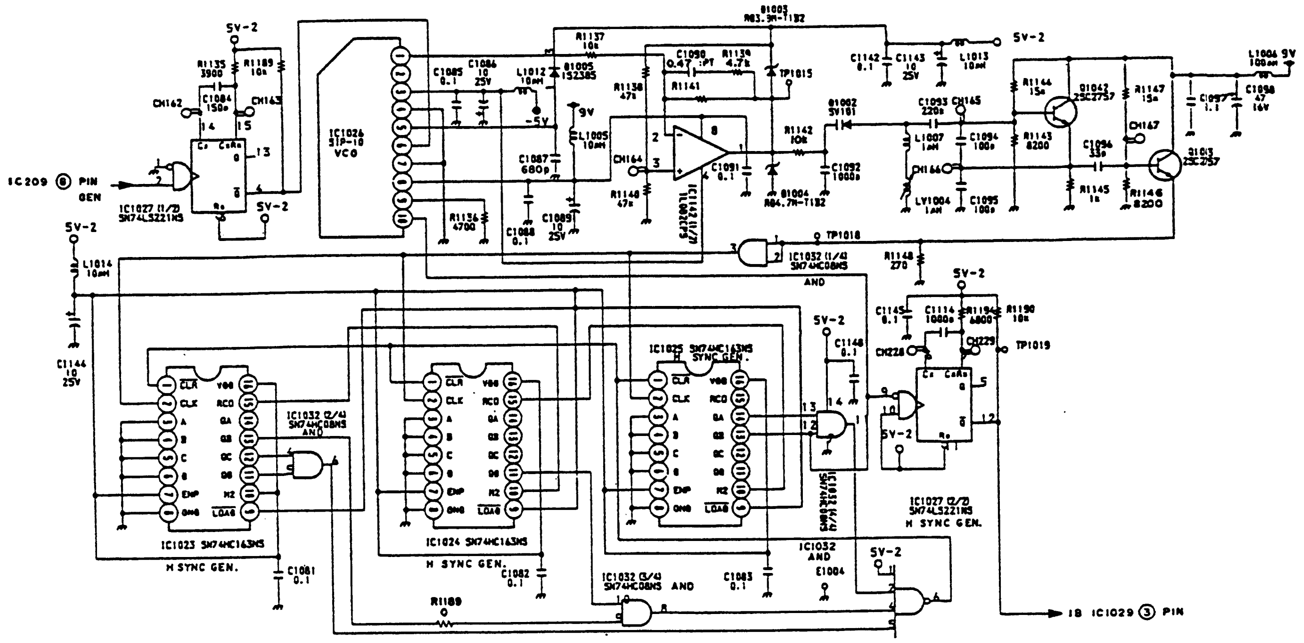

5V-2
IC209 ⑧ PIN GEN
IC1027 (1/2) SN74LS221NS
IC1026 SIP-10 VCO
IC1023 SN74HC163NS H SYNC GEN.
IC1024 SN74HC163NS H SYNC GEN.
IC1025 SN74HC163NS H SYNC GEN.
IC1032 (1/4) SN74HC08NS AND
IC1032 (2/4) SN74HC08NS AND
IC1032 (3/4) SN74HC08NS AND
IC1027 (2/2) SN74LS221NS H SYNC GEN.
TP1015
TP1018
TP1019
Q1042 2SC2757
Q1043 2SC2757
L1006 9V
18 IC1029 ③ PIN

Fig. 2-7 AFC Circuit

2-9. INT SYNC Generation Circuit

The internal synchronous signal employs a synchronous signal emitting IC which was developed for use with color video cameras.

IC1002 connects a 4fsc crystal (X1001) to Pins 25 and Pins 26 to output a COMPOSITE SYNC synchronized with the clock from the Pin 4, an HD signal from the Pin 8, a VD signal from the Pin 12 and an SC signal from the Pin 19.

2-10. INT/EXT Change-Over Circuit

The INT/EXT COMPOSITE SYNC, INT/EXT $\overline{\text{HD}}$ and INT/EXT $\overline{\text{VD}}$ signals are input to the Pin 3 of CN1002 with the data selector IC1029. They are changed by the CONTROL signal IN/$\overline{\text{MEMO}}$ from the FMY-8 Board. During SOURCE, the EXT signal is selected. During MEMORY, NO INPUT, the INT signal is selected. The selected COMPOSITE SYNC is output from the Pin 12, $\overline{\text{HD}}$ from the Pin 4 and $\overline{\text{VD}}$ from the Pin 7 of IC1029.

SC change-over of INT/EXT is carried out at IC1022, IC1001 and IC1003. During SOURCE, the EXT signal is selected only for the VBS and VIDEO signal. The INT signal is selected for the other signals.

A square waveform SC of approximately 5 Vp-p is oscillated by the Pin 8 of IC1003. Thus, the L.P.F. is composed at Q1044, Q1045 and L,C and an SC of approximately 0.6 Vp-p is generated.

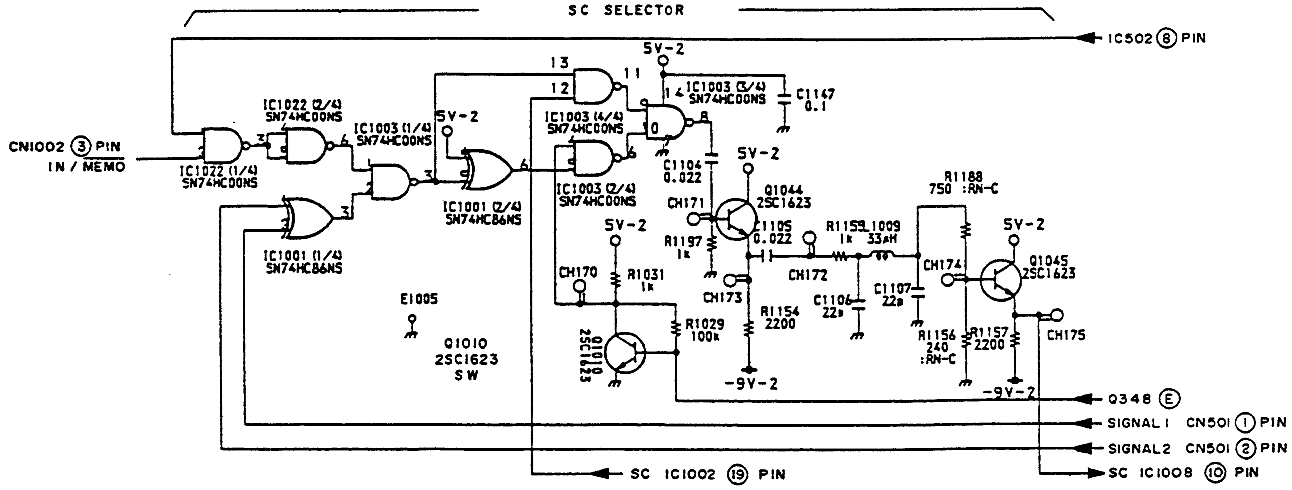

SC SELECTOR
IC502 ⑧ PIN
CN1002 ③ PIN
IN / $\overline{\text{MEMO}}$
IC1022 (2/4)
SN74HC00NS
IC1022 (1/4)
SN74HC00NS
IC1003 (1/4)
SN74HC00NS
IC1001 (1/4)
SN74HC86NS
IC1001 (2/4)
SN74HC86NS
5V-2
IC1003 (4/4)
SN74HC00NS
IC1003 (3/4)
SN74HC00NS
IC1003 (2/4)
SN74HC00NS
C1147
0.1
C1104
0.022
CH171
Q1044
2SC1623
R1197
1k
C1105
0.022
R1155
1k
L1009
33μH
R1188
750 :RN-C
CH172
CH173
CH174
C1106
22p
C1107
22p
Q1045
2SC1623
CH170
R1031
1k
R1029
100k
R1154
2200
R1156
240
:RN-C
R1157
2200
CH175
-9V-2
E1005
Q1010
2SC1623
SW
Q348 Ⓔ
SIGNAL1 CN501 ① PIN
SIGNAL2 CN501 ② PIN
SC IC1002 ⑲ PIN
SC IC1008 ⑩ PIN

Fig. 2-8 INT/EXT Change-Over Circuit

2-11. BF Generation Circuit

The COMPOSITE SYNC selected at IC1029 (INT/EXT change-over circuit) is output from the Pin 12 of IC1029 and is input to the Pin 1 of IC1030. IC1030 is so constructed that no pulse exists in V BLANKING due to trigger mono/multi. This output is input to the Pin 1 of IC1031. IC1031(1/2) is a mono/multi which determines the position of the BF signal.

That output is input to the Pin 9 of IC1031. IC1031(2/2) generates the BF signal from the Pin 12.

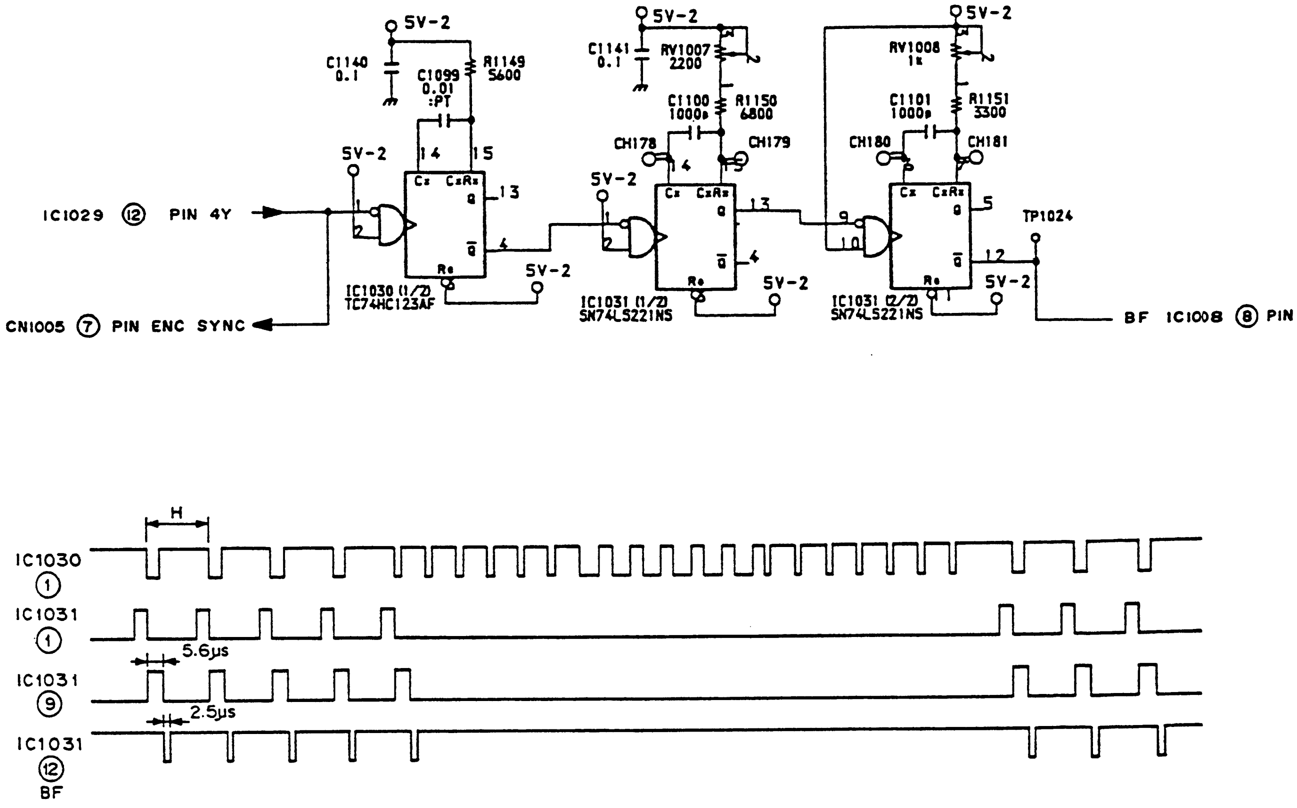

5V-2
C1140 0.1
C1099 0.01 :PT
R1149 5600
14
15
Cx CxRx
Q
13
4
Rd
1
2
IC1030 (1/2) TC74HC123AF
IC1029 ⑫ PIN 4Y
CN1005 ⑦ PIN ENC SYNC
C1141 0.1
RV1007 2200
C1100 1000p
R1150 6800
CH178
CH179
IC1031 (1/2) SN74LS221NS
RV1008 1k
C1101 1000p
R1151 3300
CH180
CH181
9
10
5
12
TP1024
IC1031 (2/2) SN74LS221NS
BF IC1008 ⑧ PIN
H
IC1030 ①
IC1031 ①
5.6μs
IC1031 ⑨
2.5μs
IC1031 ⑫ BF

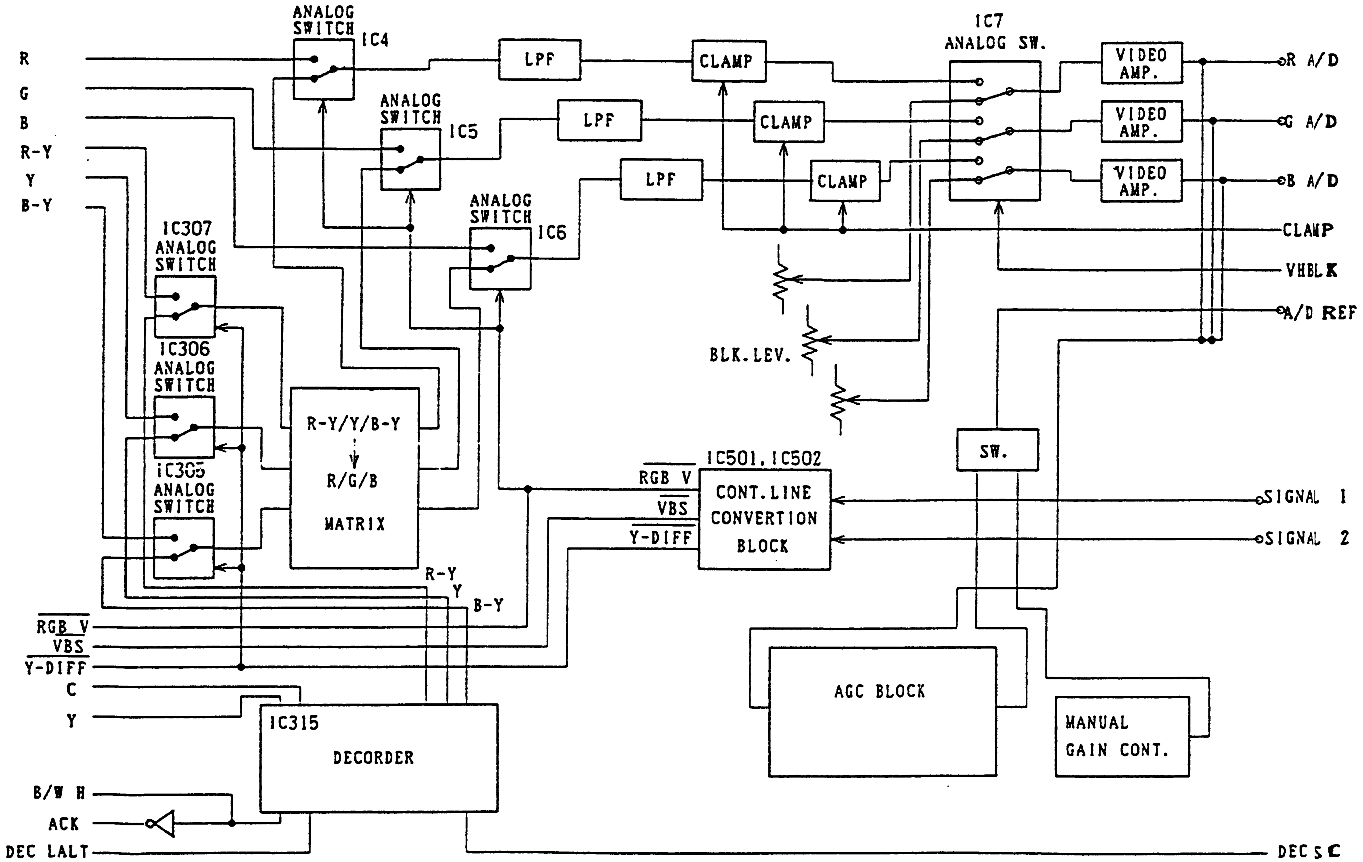
Fig. 2-9 BF Generation Circuit

3. VIDEO SIGNAL SYSTEM (VA-26 BOARD)

3-1. General

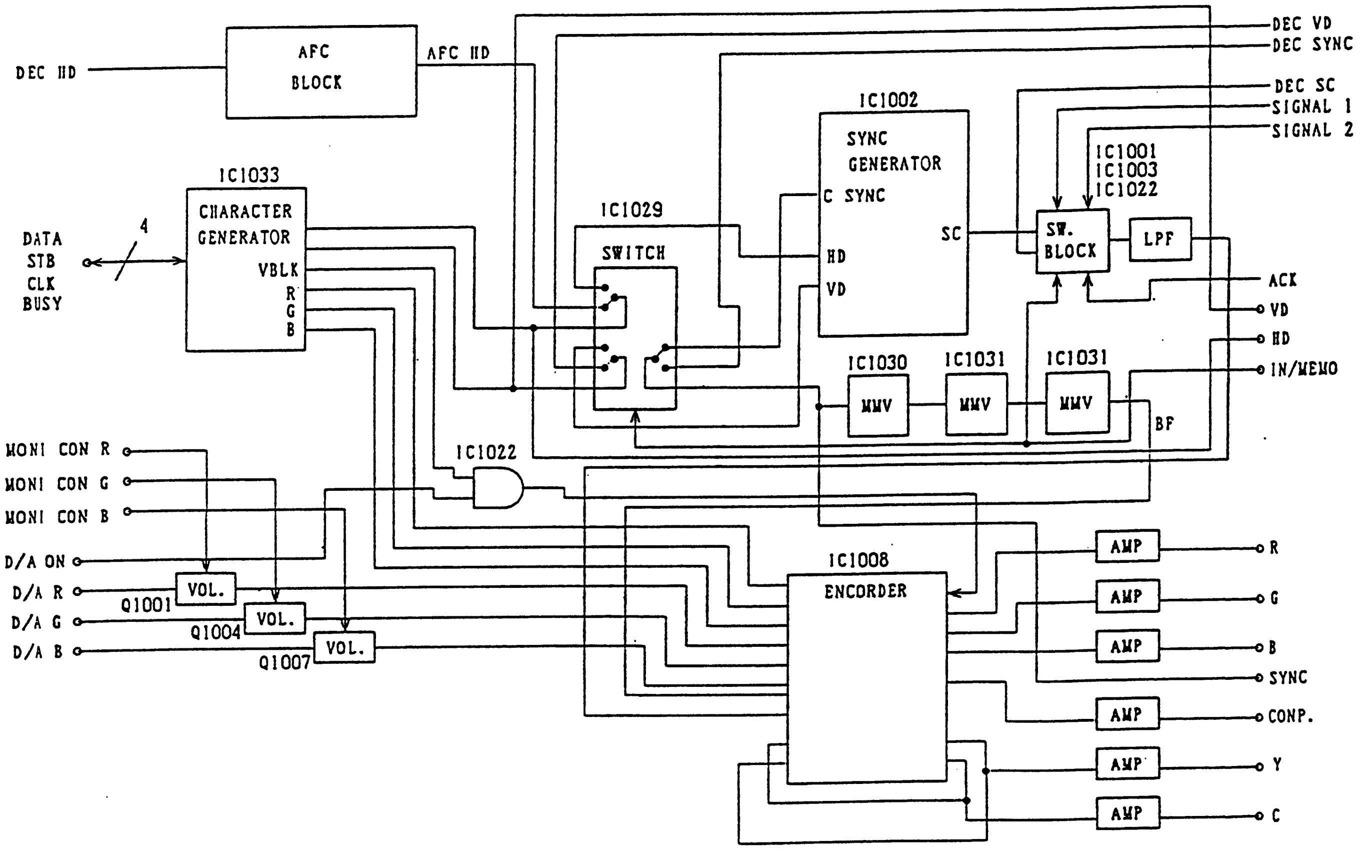
The video signal processing system is composed of the following contents.

1) Y/C separation
2) Decoder block
3) Color difference→RGB color matrix circuit
4) Clamp circuit
5) Blanking change-over circuit
6) A/D IN AMP
7) REF generation circuit
8) R.G.B. IN AMP
9) CG circuit (character generator)
10) Encoder block
11) OUTPUT AMP


R
G
B
R-Y
Y
B-Y
ANALOG SWITCH IC4
ANALOG SWITCH IC5
ANALOG SWITCH IC6
LPF
LPF
LPF
CLAMP
CLAMP
CLAMP
IC7 ANALOG SW.
VIDEO AMP.
VIDEO AMP.
VIDEO AMP.
R A/D
G A/D
B A/D
CLAMP
VHBLK
A/D REF
IC307 ANALOG SWITCH
IC306 ANALOG SWITCH
IC305 ANALOG SWITCH
R-Y/Y/B-Y
R/G/B
MATRIX
BLK.LEV.
IC501, IC502
RGB V
VBS
Y-DIFF
CONT.LINE CONVERTION BLOCK
SW.
SIGNAL 1
SIGNAL 2
R-Y
Y
B-Y
RGB V
VBS
Y-DIFF
C
Y
IC315
DECORDER
AGC BLOCK
MANUAL GAIN CONT.
B/W H
ACK
DEC LALT
DEC SC

VZ-26 BLOCK DIAGRAM (2/3)

Fig. 3-1 VA-26 Board Block Diagram (2/3)


DEC HD
AFC BLOCK
AFC HD
DEC VD
DEC SYNC
DEC SC
SIGNAL 1
SIGNAL 2
IC1002
SYNC GENERATOR
C SYNC
SC
HD
VD
IC1001
IC1003
IC1022
SW. BLOCK
LPF
ACK
VD
HD
IN/MEMO
IC1033
CHARACTER GENERATOR
VBLK
R
G
B
DATA
STB
CLK
BUSY
4
IC1029
SWITCH
IC1030
IC1031
IC1031
MMV
MMV
MMV
BF
IC1022
MONI CON R
MONI CON G
MONI CON B
D/A ON
D/A R
D/A G
D/A B
VOL.
VOL.
VOL.
Q1001
Q1004
Q1007
IC1008
ENCORDER
AMP
AMP
AMP
AMP
AMP
AMP
R
G
B
SYNC
CONP.
Y
C

VA-26 BLOCK DIAGRAM (3/3)

Fig. 3-2 VA-26 Board Block Diagram (3/3)

3-2. Y/C Separation Circuit

The Y/C separation circuit is composed of comb filter which employs a glass delay line. The glass delay line features a piezoelectric transducer for input and input attached to a glass plate. The piezoelectric transducer changes electric signals into ultrasonic waves. Due to the transmission delay in the glass, a delay time of approximately 1H = 63.416 μsec is obtained.

The frequency characteristics are basically flat band pass characteristics in a range of 3.85 MHz ± 500 KHz. The 1H delay circuit is a phase equalizer composed of Q306, L303, C305 and R485. The filters LV310, R323, L304 and C308 are used to carry out low band phase compensation for the glass delay line.

In order to combine the amplitude of delay time between the signal that has passed the 1H delay line (DL301) and the direct signal, LV301 is used for phase adjustment and RV302 is used for amplitude adjustment.

The output of the glass delay line is applied together with the direct signal to the bridge circuits R324, R325, R326 and R327 to create a plus-minus signal.

The chroma signal is output from the Pin 2 of the 1H delay line. It passes through the TI301 bandpass filter and is sent to the Pin 2 of IC301 (analog switch). The Y signal is output from Pin 1 of the 1H delay line. The Y signal that is obtained undergoes pull-up of the high band element due to the frequency characteristics of the glass delay line. By means of the F-characteristic correction circuits L319, C336, R486 and L320, C337, R487, this section is made flat. In addition, the Y signal passes through a delay line (DL302) of approximately 340 nsec to align the Y/C Delay. The Y signal output from the DL302 is sent to the Pin 2 of IC308 (analog switch).

3-3. Decoder Block

The Y signal of the Composite Video which has undergone Y/C separation is sent to the analog switch IC308. As for the other input to IC308, the Composite Video signal output from the Pin 1 of CN302 is input to the Pin 1 via a buffer and RV. IC308 is controlled according to detection of burst/no burst by the decoder in order to carry out changing between VBS/VS signals.

The Y signal output from the Pin 15 of IC308 is sent to the Pin 2 of IC302 (analog switch). The other Y signal to IC302 is a S-Video Y signal. The Y signal that is selected according to set control is sent to the Pin 27 of the decoder IC IC315.

In the same way, regarding the chroma signal of the Composite Video which has undergone Y/C separation, the other chroma signal to IC301 which is sent to the analog switch IC301 is an S-Video chroma signal. The chroma signal that is selected according to set control is sent to the Pin 24 of the IC315 decoder IC.

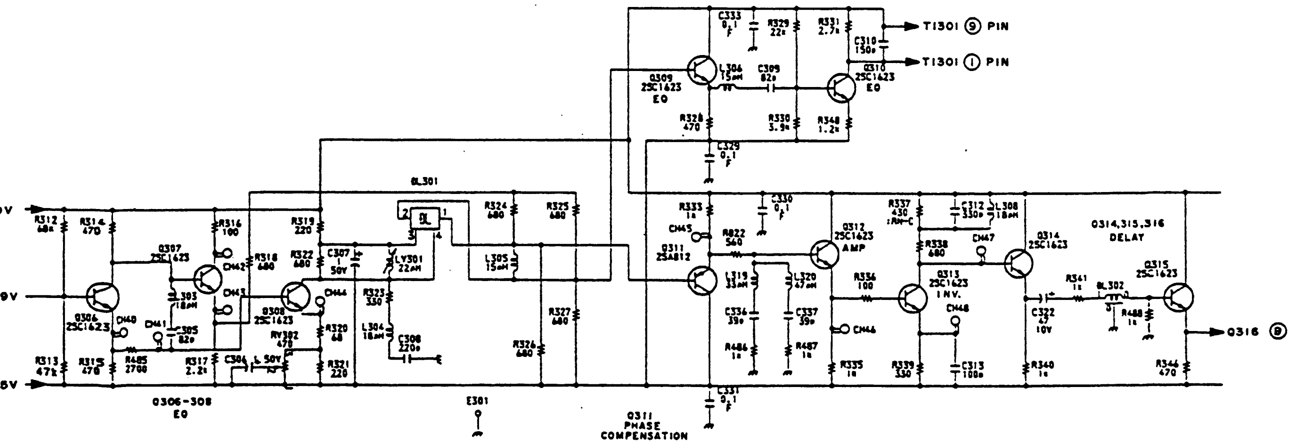

+9V
+9V
-5V
R312 68k
R314 470
R313 47k
R315 470
Q306 2SC1623
CH40
CH41
R485 2700
Q307 2SC1623
L303 18μH
C305 82p
R316 100
CH42
CH43
R317 2.2k
C304 1 50V
R318 680
R319 220
R322 680
Q308 2SC1623
RV302 470
CH44
R320 68
R321 220
Q306-308 EO
C307 1 50V
DL301
DL
LY301 22μH
R323 330
L304 18μH
C308 220p
E301
R324 680
R325 680
L305 15μH
R327 680
R326 680
Q309 2SC1623 EO
C333 0.1 F
L306 15μH
C309 82p
R329 22k
R331 2.7k
C310 150p
Q310 2SC1623 EO
R328 470
R330 3.9k
R348 1.2k
C329 0.1 F
T1301 ⑨ PIN
T1301 ① PIN
R333 1k
CH45
Q311 2SA812
R822 560
C330 0.1 F
L319 33μH
L320 47μH
C336 39p
C337 39p
R486 1k
R487 1k
C331 0.1 F
Q311 PHASE COMPENSATION
Q312 2SC1623 AMP
R336 100
CH46
R335 1k
R337 430 :RN-C
R338 680
Q313 2SC1623 INV.
CH48
R339 330
C312 330p
L308 18μH
CH47
C313 100p
Q314 2SC1623
R340 1k
C322 47 10V
R341 1k
DL302
R488 1k
Q314,315,316 DELAY
Q315 2SC1623
R344 470
Q316 ⑧

Fig. 3-3 Y/C Separation Circuit

IC315 Operational Description

1. Synchronizing separation system

Regarding the video signal that is input from the Pin 27, a synch chip is clamped to undergo synchronization and separation. The SYNC pulse created in this way is used as the basis for creating the BF, H Blanking pulses which are supplied to the individual circuits. Of these, the SYNC and the BF pulses pass through a buffer to be converted to the TTL level and are then output to the Pin 2 and the Pin 3.

2. Brightness signal reproduction system

The video signal output from the Pin 27 undergoes clamping of the pedestal and is amplified by the Y AMP.

3. ACC System

Regarding the chroma signal output from the Pin 24, the burst signal is detected by the ACC DET and there is feedback to the ACC AMP according to the detected detection output. This is controlled in such a way that the burst level is a constant value.

4. APC System

The signal whose level has been specified by the ACC AMP goes through the BURST GATE circuit where only the burst signals enter the APC circuit. Meanwhile, regarding the VXO output, carriers of 0° and 90° are created in the phase-shifting circuit.
The 90° carrier passes through the HUE circuit and enters the APC. Here there is phase comparison with the input burst and then feedback to the VXO so that the phase difference is 90° . The 0° and 90° carriers created in this way are supplied to the B-Y and R-Y DEM. As a result, by rotating the phase of the 90° carrier in the HUE circuit it is possible to change the axis of demodulation.
The SC output from the Pin 14 is sent as DEC SC to the INT/EXT SC change-over circuit.

5. Color signal reproduction system

The chroma signal amplified by the ACC AMP is then amplified by the CHROMA AMP after which it undergoes demodulation by B-Y DEM and R-Y DEM. It is then sent to the Pins 16 and 17 as a color difference signal. Since adjustment of HUE/COLOR is carried out on the front panel, a DC AMP is included with the OP AMP of IC303 so that the DC voltage is changed according to the controls as follows : HUE : Pin 10 of IC315, COLOR : Pin 23 of IC315.

6. ACK Operation

Use is made of changes in the DC voltage of the Pin 4 of the ACK time constant terminal IC315 in order to judge whether there is a burst or not. The Pin 4 of IC315 is connected to the Pin 2 of IC304 (INVERTING terminal).
the Pin 3 of IC304 (NON-INVERTING terminal) is the THRESHOLD voltage adjusted by RV317.
When a signal enters indicating a burst, the voltage of the Pin 2 of IC304 increases. When it exceeds the THRESHOLD voltage, IC304 carries out comparator operation so that the output of the Pin 1 becomes Low. When a signal enters indicating no burst, the voltage of the Pin 2 of IC304 falls so that the output of IC304 becomes High. This output becomes the control signal for changing between a VBS and VS Y signal and a VBS and VS burst signal.
The Y signal, B-Y signal and R-Y signal are output from the Pins 16, 17 and 18 of IC 315. Each signal passes through the level adjustment filter. After demodulation, the B-Y and R-Y signals are later than the Y signal. As a result, the Y signal passes a 500 nsec delay line (DL303) in order to match the times of the signals. The signals are then sent to the analog switches IC307, IC306 and IC305. Here, in accordance with the control of the unit, there is selection either of the decoder output color difference signal or the color difference signal that has been directly input to the unit.

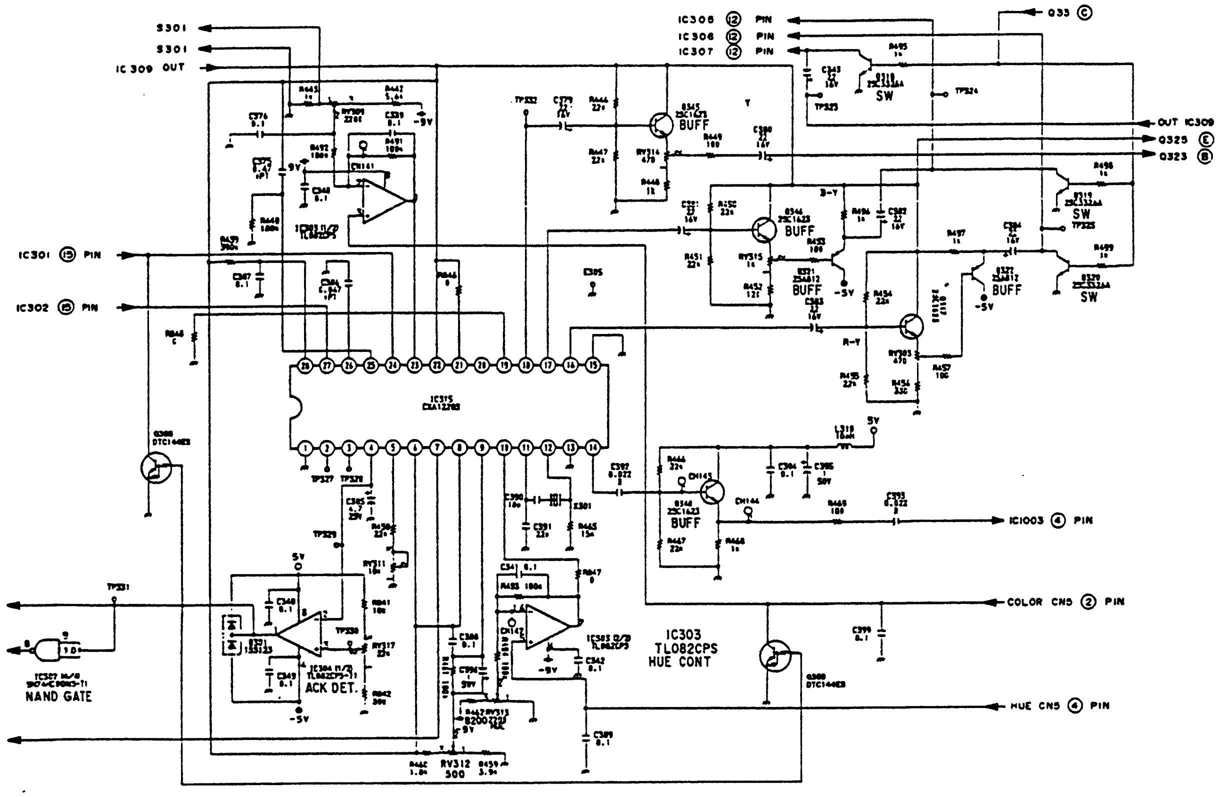

S301
S301
IC309 OUT
IC306 ⑫ PIN
IC306 ⑫ PIN
IC307 ⑫ PIN
Q33 ©
OUT IC309
Q325 Ⓔ
Q323 Ⓑ
BUFF
BUFF
BUFF
BUFF
BUFF
SW
SW
SW
B-Y
R-Y
IC301 ⑬ PIN
IC302 ⑯ PIN
IC315
5V
IC1003 ④ PIN
COLOR CN5 ② PIN
HUE CN5 ④ PIN
IC303
TL082CPS
HUE CONT
ACK DET.
NAND GATE
IC308 ⑨PIN
IC1022 ①PIN
IC1029 ⑩PIN
-5V
-9V
RV312 500

Fig. 3-4 IC315 Operational Description Circuit

3-4. Color Difference → RGB Matrix Circuit

This is the circuit for changing the analog switch OUT color difference signal to the R, G, B signals.

This is a discrete circuit composed of a matrix circuit. The matrix out R, G, B signals pass through the level adjustment circuit and are sent to the Pins 2 and 3 of the analog switches IC4, IC5 and IC6. Here, in accordance with control from the unit, either the matrix OUT R, G, B signal or the R, G, B signal directly input to the unit is selected.

3-5. Clamp Circuit

The R, G, B signals are output in the same way from the analog switch and are sent to the A/D converter of the FMY-8 Board. As a result, this explanation is limited to the G signal.

The G signal output from the Pin 15 of the analog switch IC5 is amplified approximately 1.5 times at an AMP circuit composed of Q12 and Q13 in consideration of the later attenuation of L.P.F. The amplified G signal passes through the L.P.F with a cutoff of 8.5 MHz and is generated in the synchronous processing system. Q16 goes ON as a result of the clamp pulse and the pedestal of the G signal is clamped at 0V.

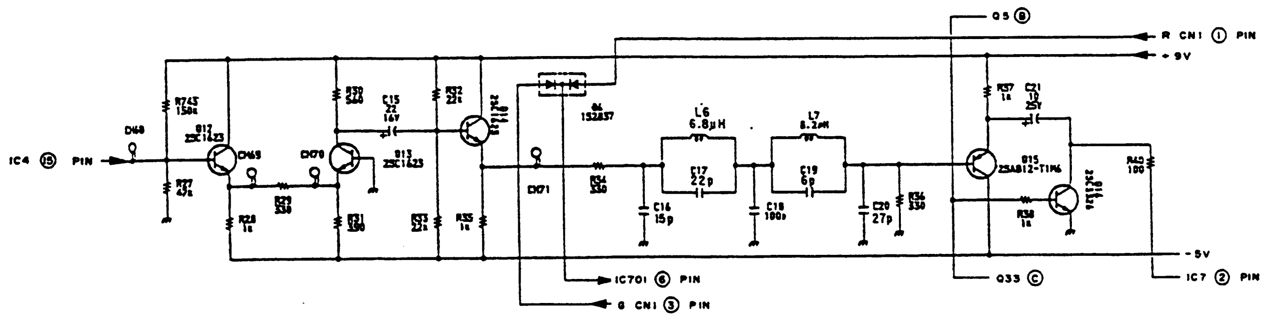

Q5 Ⓑ
R CN1 ① PIN
+9V
IC4 ⑮ PIN
Q12 2SC1623
Q13 2SC1623
D1 1S2837
L6 6.8μH
L7 8.2μH
C17 22p
C19 6p
C16 15p
C18 180p
C20 27p
Q15 2SA812-T1M6
-5V
IC701 ⑥ PIN
G CN1 ③ PIN
Q33 ©
IC7 ② PIN

Fig. 3-5 Clamp Circuit

3-6. Blanking Alternate Circuit

Even when the COMPOSITE VIDEO, S-VIDEO color difference signal is converted into the R, G, B signals, it has a SYNC signal.Also, even with the R, G, B signals, there is a SYNC on G signal in which SYNC is added to the G signal. Before sending to the A/D circuit, it is necessary to change the SYNC section to the pedestal level (black level). Here the V. H blanking pulse created in the synchronous processing system is input to the control signal of the analog switch IC7. The blanking section is changed to the DC level adjusted with RV3.

3-7. A/D IN AMP Circuit

The A/D IN AMP is composed of a difference amplifier which amplifies approximately 10 dB. Because A/D IN is defined as 0V to standard 1.8 V, it is possible to adjust the GAIN and OFF SET. The OFF SET voltage passes through a DC AMP composed of an operation amp and is supplied to the INVERTING terminal of the A/D IN AMP at low `impedance.

3-8. REF Generation Circuit

The REF voltage of the A/D converter is supplied from the VA-26 Board.

Regarding the REF voltage, a switch on the front panel makes it possible to switch between the MANU mode and the AUTO mode. In the MANU mode, the standard is defined as 1.8 V and GAIN adjustment is carried out from the front panel. Thus, the DC AMP is composed of IC702 (2/2). Because the adjustment range can be altered approximately between 1.1 V to 2.75 V, processing is possible for signals from 61 IRE to 152 IRE.

In the AUTO mode, the level of the input signal is detected to automatically set the REF voltage. The REF voltage can be changed between 1 V and 2.6 V corresponding to 40 IRE to 140 IRE.

In addition, when the video signal is dark, the gain is increased with the AGC so that the print picture is unnaturally bright. In the case of signals with strong contrast, the shading of the bright sections disintegrates so that the grading is adversely affected.

3-9. R, G, B, IN AMP Circuit

The signals from the FMY-8 Board D/A converter are input to the connector CN1004 of the VA-26 Board at a level of approximately 1 Vp-p. In this circuit there is adjustment of the analog R, G, B GAIN for the monitor.

It is possible to adjust the Gain of the individual color signals for R, G, B in order to unify the color of the print screen and the color of the monitor screen. This adjustment is carried out by controlling the GAIN with the volume on the rear panel so that CN1003 is used to impress the DC voltage to FET transistors Q1001, 1004 and 1005. Because the circuit structure is exactly the same for the R, G, B AMP, the discussion here will be limited to the G channel. The G signal is input to FET Q1004 which is used as the variable resistance element for the input from the base grounding AMP Q1005. It is then amplified by the Q1006 buffer of the Q1005 base grounding AMP. With the AMP GAIN at approximately one time the original value and the G volume on the rear panel set to the center click position, RV1002 is adjusted so that the output level of TP1002 is 1 Vp-p.

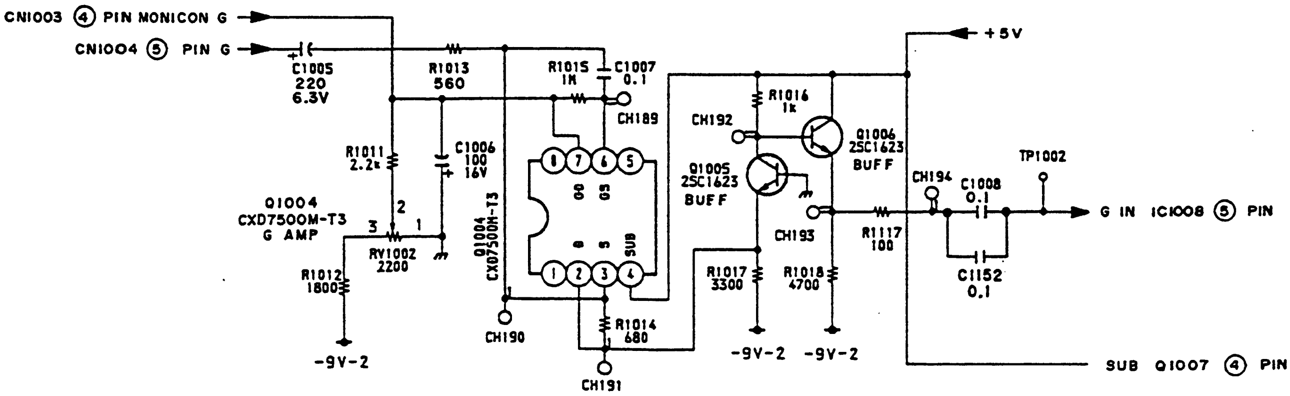

CN1003 ④ PIN MONICON G
CN1004 ⑤ PIN G
C1005
220
6.3V
R1013
560
R1015
1M
C1007
0.1
CH189
R1011
2.2k
C1006
100
16V
Q1004
CXD7500M-T3
G AMP
3
2
1
RV1002
2200
R1012
1800
-9V-2
Q1004
CXD7500M-T3
8
7
6
5
D0
G5
1
2
3
4
S
SUB
CH190
R1014
680
CH191
+5V
R1016
1k
CH192
Q1006
2SC1623
BUFF
Q1005
2SC1623
BUFF
CH193
R1117
100
R1017
3300
R1018
4700
-9V-2
-9V-2
CH194
C1008
0.1
TP1002
C1152
0.1
G IN IC1008 ⑤ PIN
SUB Q1007 ④ PIN

Fig. 3-6 D/A Out GAIN Adjustment Circuit

3-10. CG Circuit

IC103 is a character generator.
The HD selected by the IN/EXT switching IC1029 is input to the Pin 19 ($\overline{\text{H SYNC}}$) of IC1013 and the VD is input to the Pin 18 ($\overline{\text{V SYNC}}$). IC1013 uses an LC oscillator to oscillate a clock of approximately 6 MHz. By inputting the data from the KY-12 Board to the CN1001 connector of the VA-26 Board, the superimpose control signal is output from the blanking terminal of the Pin 15 of IC1013. Character signals are output from the R, G, B output terminals of the Pins 12, 13 and 14 of IC1013.

3-11. Encoder Block Circuit

IC1008 is an encoder IC for carrying out superimpose with the analog R, G, B signals. The superimpose circuit is composed of the internal switcher and mixer in IC1008 and a −6 dB attenuator. This is located between the clamp circuit and the output circuit. The character generator R, G, B signals input to the Pins 1, 2 and 3 of IC1008 and the video R, G, B signals input to the Pins 4, 5 and 6 form two systems. There is switching between these systems to superimpose the character signals on the monitor screen.
V Blanking signal is output from the Pin 15 of IC1013 to control the characters that are displayed on the monitor screen.
This V blanking signal is supplied to the Pin 25 of IC1008 as a switching signal YS for blanking of the image.
When the YS signal is High, the R, G, B signals are switched over momentarily from the video side to the character side so that characters are displayed on the monitor.
Also, when characters are displayed, except in special cases (basic display screen, COLOR AD), there is halftone control from the SY-9 Board so that the input to the Pin 7 of CN501 of the VA-26 Board becomes High which makes the Pin 27 YM signal of IC1008 also High. As a result, IC1008 makes a halftone (−6 dB) of the superimposed video screen so that the character display is more legible.
At the encoder circuit, an R signal, G signal and B signal are output from the Pins 21, 22 and 23 of IC1008. These signals are then encoded to output a Composite Video signal. The Composite Video signal is output from the Pin 19.
The demodulating chroma signal C is output from the Pin 13 of IC1008 and undergoes band restriction with the 3.58 MHz bandpass filter FL1001. It is then returned to the Pin 16 for mixing with the Y signal.
Also, in order to match the phase of the brightness signal Y and the chroma signal, the brightness signal Y output from the Pin 14 of IC1008 is delayed by the 180 nsec delay line DL1001, undergoes level adjustment at RV1004 and is returned to the Pin 17. The chroma signal which has been returned to the Pin 16 and the Y signal of DL1001 OUT are used to output the S Video Signal.
For the sub-carrier signal for encoder use, there is input to the Pin 10 of the SC signal described in the synchronous processing system INT/EXT switching circuit.
For the burst flag, the burst flag described in the BF generation circuit of the synchronizing processing system is input to the Pin 8.
For the Composite Sync Signal, the Composite Sync signal described in the synchronizing processing system INT/EXT switching circuit is input to the Pin 11.

3-12. OUTPUT AMP Circuit

The R signal G signal, B signal, Composite Video signal, S-Video C signal and Y signal are adjusted to the appropriate level in the two amps. The R, G, B signals are sent to the IF-19 Board from CN1005, the Composite Video signal from CN1006, the S-Video signal from CN1007.

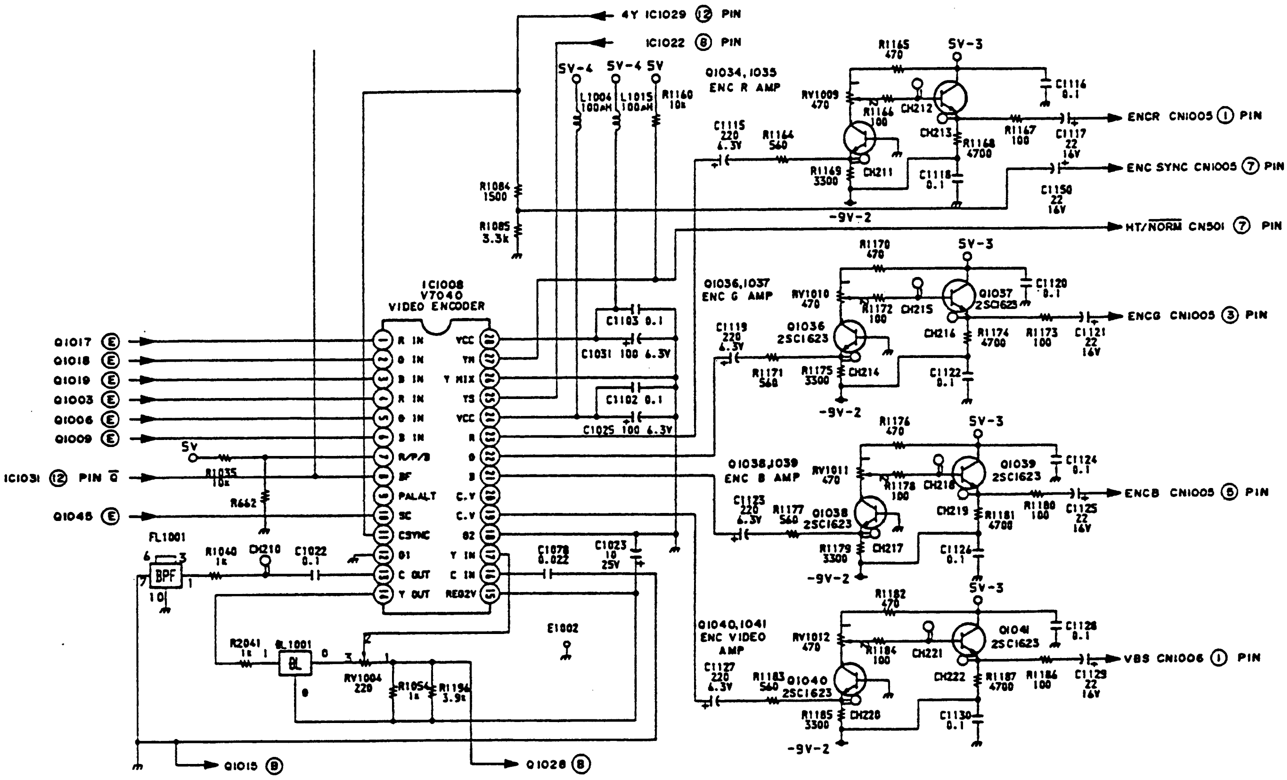

4Y IC1029 ⑫ PIN
IC1022 ⑧ PIN
5V-4
5V-4
5V
L1004 100μH
L1015 100μH
R1160 10k
R1084 1500
R1085 3.3k
IC1008
V7040
VIDEO ENCODER
Q1017 Ⓔ
Q1018 Ⓔ
Q1019 Ⓔ
Q1003 Ⓔ
Q1006 Ⓔ
Q1009 Ⓔ
5V
IC1031 ⑫ PIN Q̄
R1035 10k
R662
Q1045 Ⓔ
R IN
G IN
B IN
R IN
G IN
B IN
R/P/B
BF
PALALT
SC
CSYNC
G1
C OUT
Y OUT
VCC
YN
Y MIX
YS
VCC
R
G
B
C.V
C.V
G2
Y IN
C IN
REG2V
C1103 0.1
C1031 100 6.3V
C1102 0.1
C1025 100 6.3V
FL1001
BPF
R1040 1k
CH210
C1022 0.1
C1078 0.022
C1023 10 25V
E1002
R2041 1k
DL1001
DL
RV1004 220
R1054 1k
R1194 3.9k
Q1015 Ⓑ
Q1028 Ⓑ
Q1034, 1035
ENC R AMP
R1165 470
5V-3
RV1009 470
R1166 100
CH212
C1116 0.1
C1115 220 6.3V
R1164 560
CH213
R1168 4700
R1167 100
C1117 22 16V
ENCR CN1005 ① PIN
R1169 3300
CH211
C1118 0.1
C1150 22 16V
ENC SYNC CN1005 ⑦ PIN
-9V-2
HT/NORM CN501 ⑦ PIN
Q1036, 1037
ENC G AMP
R1170 470
5V-3
RV1010 470
R1172 100
CH215
Q1037 2SC1623
C1120 0.1
C1119 220 6.3V
Q1036 2SC1623
CH216
R1174 4700
R1173 100
C1121 22 16V
ENCG CN1005 ③ PIN
R1171 560
R1175 3300
CH214
C1122 0.1
-9V-2
Q1038, 1039
ENC B AMP
R1176 470
5V-3
RV1011 470
R1178 100
CH218
Q1039 2SC1623
C1124 0.1
C1123 220 6.3V
R1177 560
Q1038 2SC1623
CH219
R1181 4700
R1180 100
C1125 22 16V
ENCB CN1005 ⑤ PIN
R1179 3300
CH217
C1126 0.1
-9V-2
Q1040, 1041
ENC VIDEO AMP
R1182 470
5V-3
RV1012 470
R1184 100
CH221
Q1041 2SC1623
C1128 0.1
C1127 220 6.3V
R1183 560
Q1040 2SC1623
CH222
R1187 4700
R1186 100
C1129 22 16V
VBS CN1006 ① PIN
R1185 3300
CH220
C1130 0.1
-9V-2

Fig. 3-7 Encoder Circuit

4. DIGITAL VIDEO SYSTEM (FMY-8 BOARD)

4-1. General

The FMY-8 Board is the circuit for taking video signals to the printer and storing in the memory. It is composed as shown in the block diagram below.

1) A/D Block
2) D/A Block
3) DRAM Block
4) SRAM Block
5) MMU Block
6) SELECT MASKING Block
7) SYNC Block

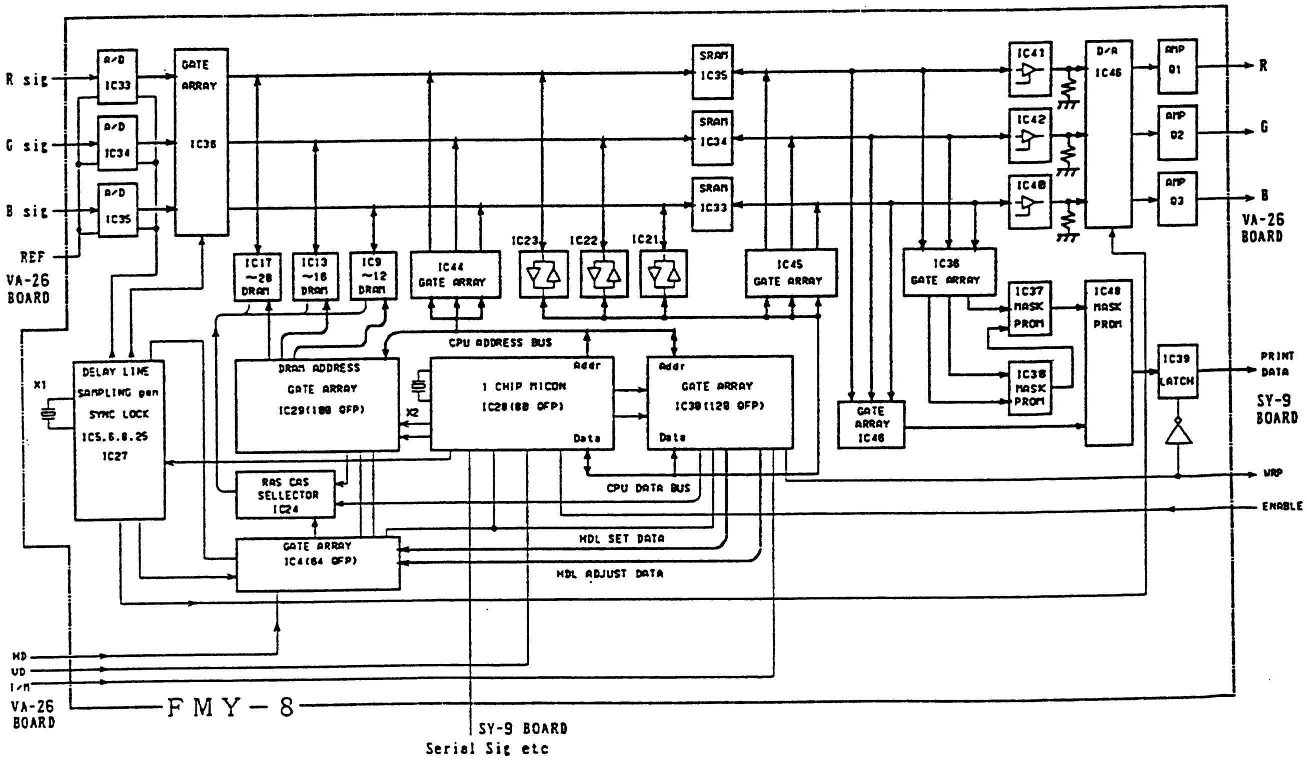

R sig
G sig
B sig
REF
VA-26 BOARD
A/D IC33
A/D IC34
A/D IC35
GATE ARRAY IC36
IC17 ~20 DRAM
IC13 ~16 DRAM
IC9 ~12 DRAM
IC44 GATE ARRAY
IC23
IC22
IC21
SRAM IC35
SRAM IC34
SRAM IC33
IC45 GATE ARRAY
IC36 GATE ARRAY
IC41
IC42
IC40
D/A IC46
AMP Q1
AMP Q2
AMP Q3
R
G
B
VA-26 BOARD
IC37 MASK PROM
IC38 MASK PROM
IC48 MASK PROM
IC39 LATCH
PRINT DATA
SY-9 BOARD
X1
DELAY LINE SAMPLING gen SYNC LOCK IC5.6.8.25 IC27
CPU ADDRESS BUS
DRAM ADDRESS GATE ARRAY IC29(100 QFP)
X2
1 CHIP MICON IC28(80 QFP)
Addr
Data
Addr
GATE ARRAY IC30(120 QFP)
Data
GATE ARRAY IC46
RAS CAS SELLECTOR IC24
CPU DATA BUS
WRP
ENABLE
GATE ARRAY IC4(64 QFP)
HDL SET DATA
HDL ADJUST DATA
HD
VD
I/H
VA-26 BOARD
FMY-8
SY-9 BOARD
Serial Sig etc

Fig. 4-1 FMY-8 Board Block Diagram

4-2. A/D Block

Figure 4-2 shows the circuits comprising the A/D Block.

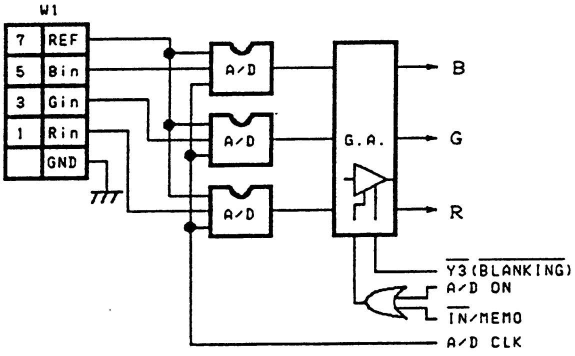


Fig. 4-2 A/D Block Circuit

The main structural elements are three A/D converters (CXD1175AM × 3) and three state buffers (1 gate array).
In this Board, the analog R, G, B signals from the VA-26 Board are converted into digital 8-bit signals.
In the black level, analog is GND level and digital is hexadecimal 00H.
At the white level, there is V Ref voltage supplied from the VA-26 Board so that digital is hexadecimal FFH.
(In the UP-5000 the white level is supplied with minus voltage. In the same way, the V Ref voltage was minus.)
In the UP-5100/5200 MD series, the white level is supplied with plus voltage. For your reference, one example of analog input level is shown in Table 4-1 where the AGC of the input signal is in the center of Manual (*).
(* : Open the ribbon door on the front of the set and set the AUTO/MANUAL switch to MANUAL. Then turn the MANUAL volume to the center.)

Signal input during MANUAL gain		VRef input during MANUAL gain (gain level is center)
White level voltage	Black level voltage	
1.8 V	GND	1.8 V

Table. 4-1

During MANUAL gain where the gain is at the center, the VA-26 Board adjustment is off when the values in table 4-1 are not obtained.
As for the sampling clock, a 14.31818 MHz clock compiled in the SYNC circuit block (locked to H) is matched to the correct phase in the delay line and then input (in order to match the timing with the D/A and the timing with the DRAM).
The control signals of this block include the RAS · CAS signal system of the DRAM and an enable signal (OE) that outputs and controls the digital data. Due to the impedance of the later blocks, the A/D output uses a gate array (3ch 3-state buffer). The enable signal is input to the output control terminal of this gate array. The enable period is within the usual picture area period at the time the external output is selected. When the image stored in the memory undergoes monitor out or when there is blanking, the $\overline{OE}$ signal goes to H level and there is no output of data.

4-3. D/A Block

Figure 4-3 shows the circuits comprising the D/A Block.

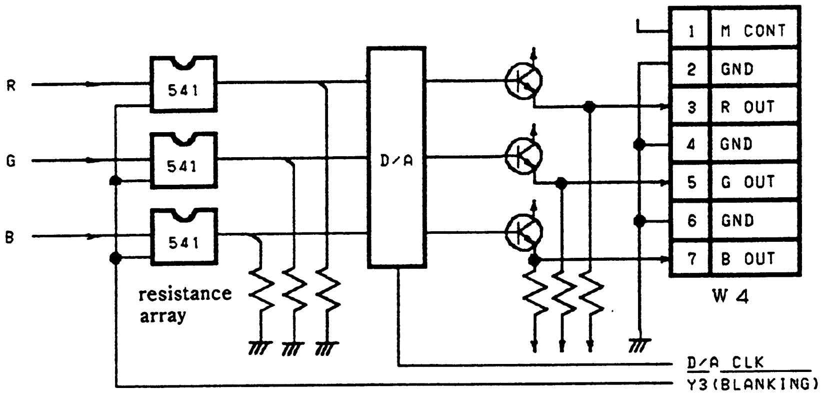


Fig. 4-3 D/A Block Circuit

The main structural elements are an IC consisting of a combination of 3 channels of D/A converters (CXA1260Q-Z), three 3-state buffers (HC541) and three pull-down resistance arrays. In this block the digital 8-bit R, G, B signals are converted to analog signals and sent to the VA-26 Board.

The analog output level of the D/A converter is shown in table 4-2.

white level voltage	black level voltage	(black level—white level) voltage
approx. 5V	approx. 4V	approx. 1V

Table. 4-2

As for the D/A conversion clock, a 14.31818 MHz clock compiled in the SYNC circuit block (locked to H but with a different phase as the A/D conversion clock) is matched to the appropriate phase in the delay line and then input.

With the R, G, B signal, the system is black level during the SYNC period.

As a result, the video signal undergoes full swing at 256 gradations on an 8-bit digital signal bus.

The control signal of this block requires a signal to make the image signal level to be black level during blanking. A signal $\overline{Y3}$ is used that shows the usual picture area period. When $\overline{Y3}$ becomes H level, the output from HC541 is in high impedance state. As a result, it goes to black level due to the following pull-down array.

4-4. DRAM Block

This block is composed of 12 1M DRAM's (UP-5100/5200MD) or 12 2M DRAM's (UP-5150/5250MD) and 1 data selector (F257), 1 OR (HC32), and 3 bi-directional buffers (F245).

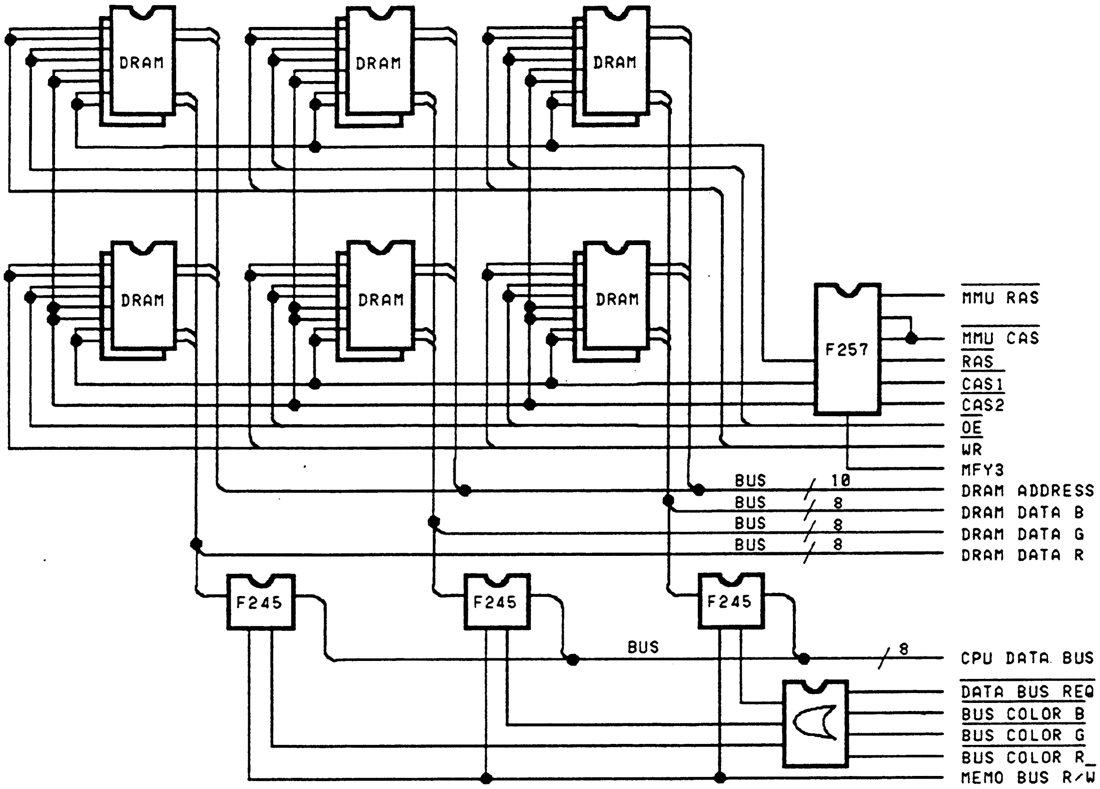

DRAM
DRAM
DRAM
DRAM
DRAM
DRAM
F257
MMU RAS
MMU CAS
RAS
CAS1
CAS2
OE
WR
MFY3
BUS
10
DRAM ADDRESS
BUS
8
DRAM DATA B
BUS
8
DRAM DATA G
BUS
8
DRAM DATA R
F245
F245
F245
BUS
8
CPU DATA BUS
DATA BUS REQ
BUS COLOR B
BUS COLOR G
BUS COLOR R_
MEMO BUS R/W

Fig. 4-4 DRAM Block Circuit

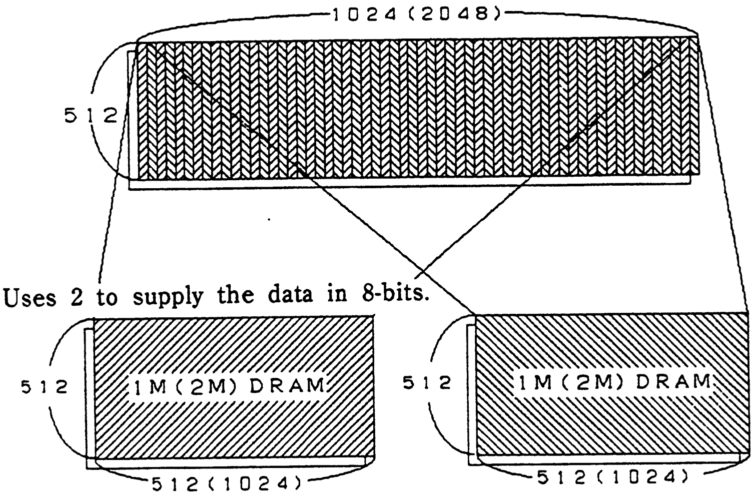
4-4-1. Memory Space

The 1M DRAM is mounted on a single-frame memory standard mechanism. Regarding one DRAM, there is a 256 K bit address space where the RAS address is 0 to 511 and the CAS address is 0 to 511. Corresponding to this is 4 bits of data (1 M bit space).

The 2M DRAM is mounted on a double-frame memory standard mechanism. Regarding one DRAM, there is a 512 K bit address space where the RAS address is 512 to 1023 and the CAS address is 0 to 1023. Corresponding to this is 4 bits of data (2 M bit space).

Regarding the 12 DRAM's, there are four each for the RGB channels. They are arranged as shown in Figure 4-5. The 1M and 2M DRAM's are interlaced in the CAS direction.

Interlacing dot by dot in the CAS direction.



Uses 2 to supply the data in 8-bits.

Items in parentheses indicate models which include a 2 FRAME memory.

Fig. 4-5 Structural Diagram of the Image Memory for Each Color

4-4-2. Interlace

The reason interlace is used is to be able to make use of the circuit (gate array) even when the DRAM access time is delayed. Thus, in response to 4 fsc sampling there is sampling at 2 fsc for a single DRAM.

This in turns creates leeway in the timing margins for the individual control signals (exRAS, CAS, etc.).

The DRAM control signals include the $\overline{\text{RAS}}$ · $\overline{\text{CAS}}$ signal and the $\overline{\text{WR}}$ · $\overline{\text{OE}}$ signal.

DRAM access can be roughly divided into the mode in which the MMU block controls the DRAM and the other modes.

These are also the blanking mode and the usual picture area mode. The mode where the MMU block controls the DRAM is the blanking period. That means that modes other than this are the usual picture area period.

4-4-3. Blanking

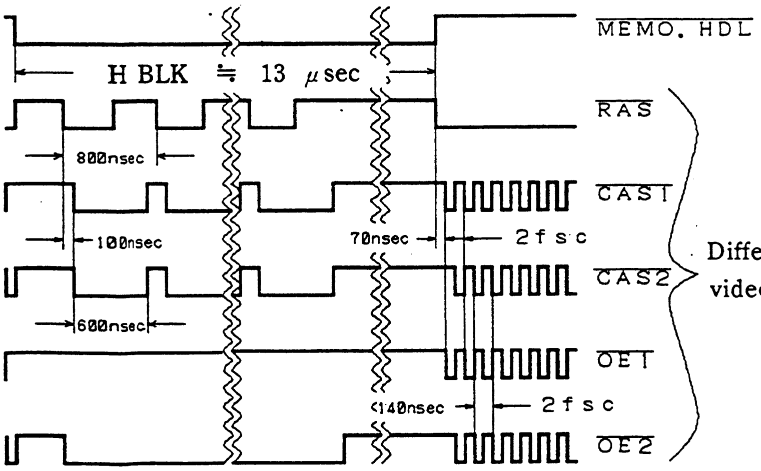
The blanking period includes the H blanking (H BLK) period and the V Blanking (V BLK) period. The V blanking period is the time during which only the MMU block can directly access the DRAM. The H Blanking period is assigned to the time where the MMU block carries out DMA period For example, captions and test patterns are written to the DRAM during the V blanking period and the $\overline{\text{DAT BUS REQ}}$ signal is low, and the DRAM data bus and CPU data bus are directly connected. Also, the DRAM control signal and the MFY3 signal change the data selector so that the $\overline{\text{RAS}}$ · $\overline{\text{CAS}}$ signal is supplied from the MMU block. In addition, when carrying out DRAM refresh or when transmitting print data, this is H blanking period. In the same way the MFY3 signal changes the data selector so that the $\overline{\text{RAS}}$ · $\overline{\text{CAS}}$ signal is sent from the MMU block.

During the usual picture area period the MMU block cannot control the DRAM. The DRAM control block synchronizes with the sampling block to carry out DRAM access. Refer to the descriptions for the following blocks for a description of these matters.

4-4-4. Phase Timing

Figure 4-6 shows the phase timing of RAS · CAS, etc. during monitor out of the image included in the frame memory.

During monitor out of the input signal, there are no waveforms of RAS · CAS in the H usual picture area.



Differs when viewing the input video signal on the monitor.

Fig. 4-6 Timing of the DRAM Control Signal

4-5. SRAM Block

Figure 4-7 shows the circuit composed of the SRAM block.

The main composite elements are three 2 K bit high-speed SRAM's, two 3-state buffers (2 gate arrays) and a 2 → 4 decoder (F139).

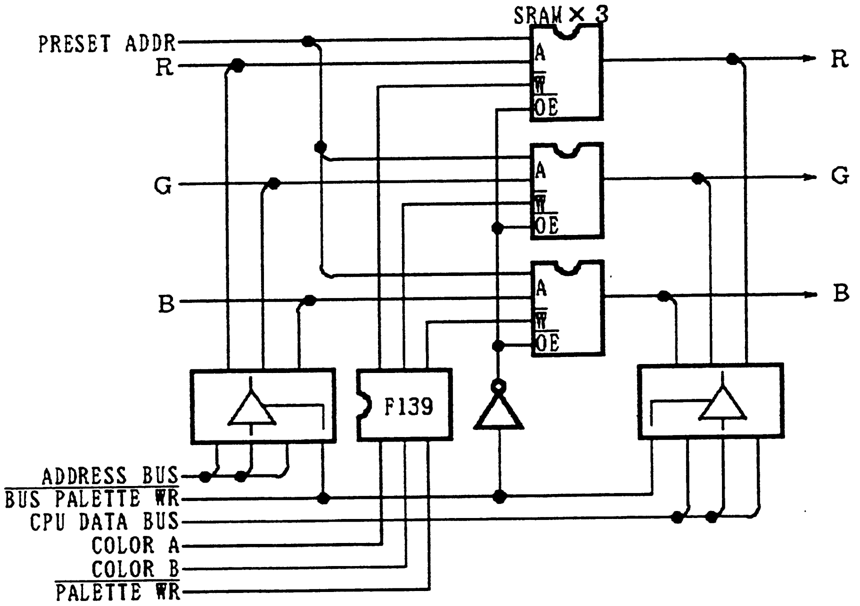

SRAM × 3
PRESET ADDR
R
G
B
A
W
OE
R
G
B
F139
ADDRESS BUS
BUS PALETTE WR
CPU DATA BUS
COLOR A
COLOR B
PALETTE WR

Fig. 4-7 SRAM Block

A video signal that has been output from the VA-26 Board and undergone digitization (A/D conversion) or a video signal that has already been stored in the DRAM (frame memory) has its amp gain changed to adjust the color balance of the video signal.
In this block, which is also known as the color palette block, in response to input (address side) to the SRAM a computational result in which a certain numerical constant is multiplied is written from the CPU (inside the MMU block). This value is output (data side) and sent to the D/A block and the print circuit (goes to SY-9 board via the masking circuit)The 2 gate arrays, decoders, etc. do not operate other when writing to the SRAM the computational results from the CPU (high impedance state).
When the COLOR-ADJUST function is selected to change the color balance, the BUS PALETTE WR signal and PALETTE WR signal are output from the MMU block during the V blanking period and the new palette data is written to the SRAM. At this time, the 2 gate arrays are allowed output by the BUS PALETTE WR signal so that the addresses and data can be sent from the MMU block to the SRAM.
Figure 4-8 shows the timing chart when the CPU sends data to the SRAM.

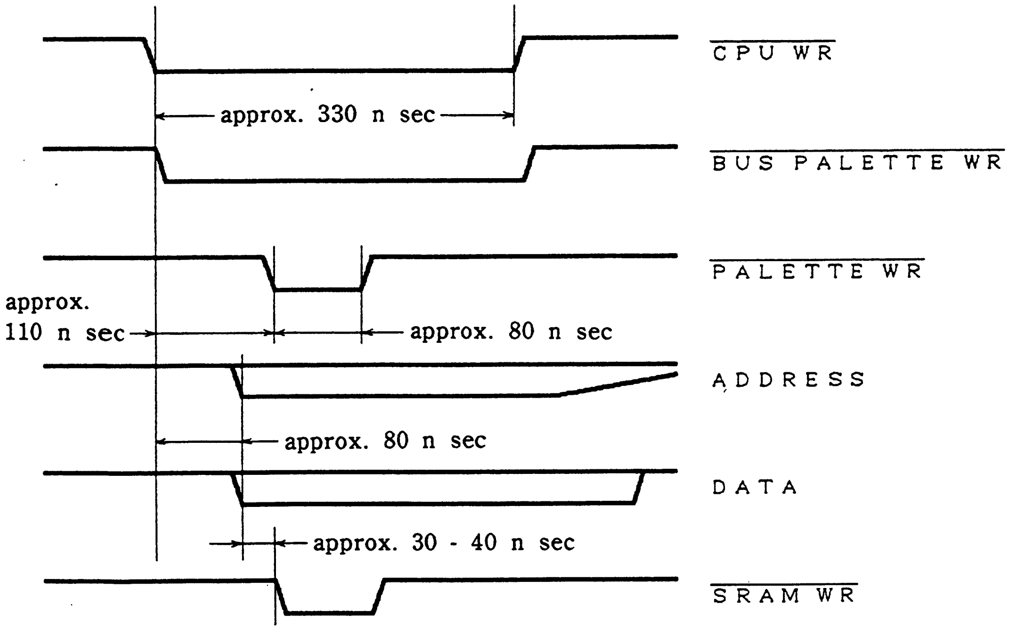


Fig. 4-8 Timing When Writing Data to the SRAM

4-6. MMU Block

Figure 4-9 MMU Block Equivalent Circuit.
The structure is simple, consisting only of two IC's One IC is a single chip microcomputer (hereafter known as CPU). This permits many of the functions of the software (program).
This block carries out the role of a controller for the FMY-8 Board, controls the frame memory (DRAM) and controls the Sync system. The following is a description of those three roles.

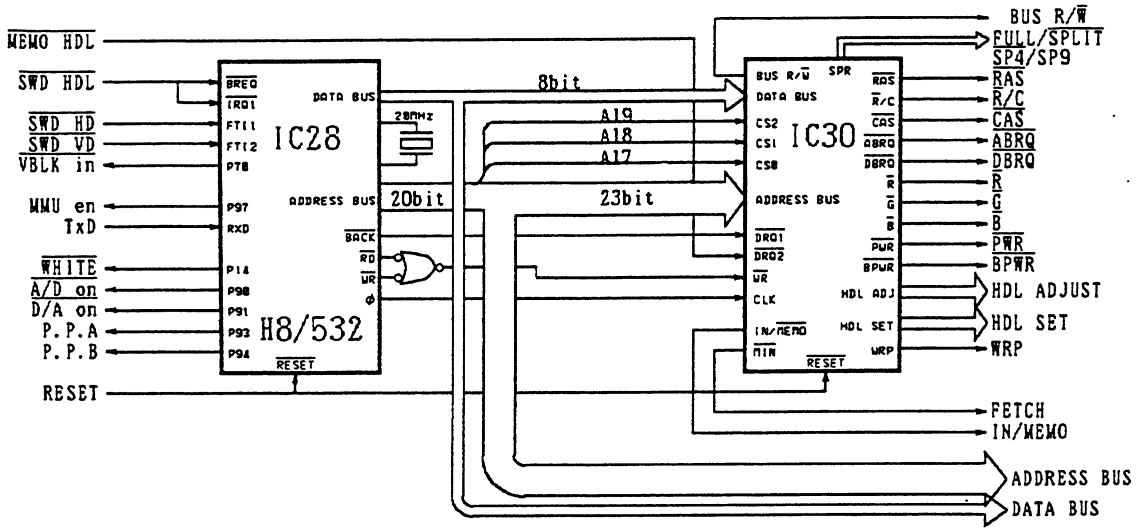

MEMO HDL
SWD HDL
SWD HD
SWD VD
VBLK in
MMU en
TxD
WHITE
A/D on
D/A on
P.P.A
P.P.B
RESET
BREQ
IRQ1
FTI1
FTI2
P78
P97
RXD
P14
P98
P91
P93
P94
IC28
H8/532
DATA BUS
ADDRESS BUS
BACK
RD
WR
ϕ
RESET
28MHz
8bit
20bit
A19
A18
A17
23bit
BUS R/W
DATA BUS
CS2
CS1
CS0
ADDRESS BUS
DRQ1
DRQ2
WR
CLK
IN/MEMO
MIN
SPR
IC30
RAS
R/C
CAS
ABRQ
DBRQ
R
G
B
PWR
BPWR
HDL ADJ
HDL SET
WRP
RESET
BUS R/W
FULL/SPLIT
SP4/SP9
RAS
R/C
CAS
ABRQ
DBRQ
R
G
B
PWR
BPWR
HDL ADJUST
HDL SET
WRP
FETCH
IN/MEMO
ADDRESS BUS
DATA BUS

Fig. 4-9 MMU Block

4-6-1. Role as controller

The board controlling the set is the SY-9 Board. The commands from here to the FMY-8 Board are transmitted to the CPU by serial communications.
The communications format is as follows, baud rate 4800 bps/data 8 bit/stop bit 2/parity no-parity. This communications is mono-directional communications from the SY-9 Board to the FMY-8 Board (the TP terminal name is TXD and the CPU terminal name is RXD). It carries out a simple handshake (MMU ENABLE) to limit communications. The reason for the handshake is as follows First of all, in order for the CPU to interpret and execute the command data that has been sent there is only enough time during V Blanking. Also, because there is only a buffer to store the sent command data to the memory, if the data is sent continuously, different commands can overlap so that data is lost.
When the CPU is ready to receive commands from the SY-9 Board, the MMU ENABLE signal is sent in several μsec after a basically fixed period following fall of the SWD VD signal.
This signal is received by the SY-9 Board and, when there is data to be sent, the command data is sent immediately after this one command at a time. (Please refer to figure 4-10.)

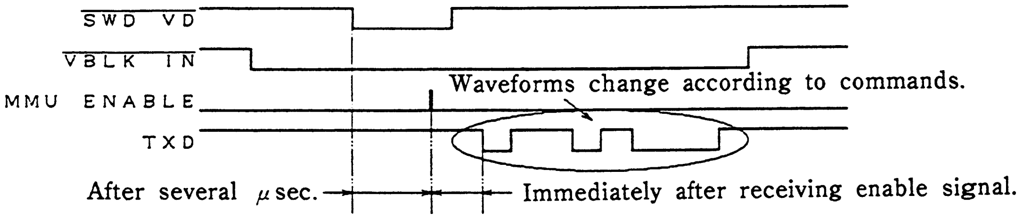

SWD VD
VBLK IN
MMU ENABLE
TXD
Waveforms change according to commands.
After several μsec.
Immediately after receiving enable signal.

Fig. 4-10 Timing Chart for Serial Communications

The command which has been sent is executed by the CPU at the next V-Blanking. More accurately speaking, it starts execution at a timing roughly when an MMU ENABLE signal is output following a set period after fall of the $\overline{\text{SWD VD}}$ signal.

The execution time can be roughly divided into two types. Simple commands are completed during blanking and the MMU ENABLE signal is immediately returned. For commands that require more time such as storing video signals in the memory or when changing the color palette (color adjust), this is done with multiple V-Blanking.

In such a case, the MMU ENABLE signal is not returned until the commands have been executed.

4-6-2. Control of the Frame Memory (DRAM)

Among blocks controlling the DRAM in addition to this block there is the DRAM control block. In this machine's frame memory system the CPU speed is insufficient to control the DRAM so that hard control is required. Receipt of high-speed hard commands is done with the DRAM control block. The MMU block can be considered as controlling this block.

As was explained on page 4-4, the operation of the DRAM can be divided into two phases, blanking period and usual picture area period.

The MMU block can directly control the DRAM during the blanking period.

The DRAM data bus becomes valid on the MMU side and the RAS.CAS addresses are changed to addresses from the MMU. Conversely, during the usual picture area period these buses, etc. are removed from the MMU so that the DRAM control block is controlling.

The blanking period can be further divided into two phases, the V blanking period and the H blanking period. (Please refer to table.4-3)

Period Block	DRAM Control Block	MMU Block
V-Blanking	Not operating (see Note)	Writing of captions
H-Blanking	Not operating (see Note)	Refresh / Data transmission
usual picture area	Read / Write	No DRAM access
Note : Change the address which is output MMU block for RAS/CAS address.		

Table. 4-3

Next the V blanking and H blanking periods during MMU operation will be explained.

· MMU operating during the V blanking period

During the V Blanking period, the CPU can write captions to the DRAM (function for writing comments, etc. in the spare area during printing).

The frame memory (DRAM group) is located in the address space on the CPU bus. Simultaneous with accessing the memory with this address, an RAS · CAS control signal synchronized with this is used to write the designated characters in the designated position. (The frame memory address space is a 23 bit space in a 2-frame memory. However, because the CPU address bus is only 20 bits, an address page function is effected in the IC30 gate array to expand to 23 bits. Also, the RAS/CAS control signal is synchronized with data output from the CPU and output from IC30.)

Figure 4-11 shows the timing when writing data from the CPU to the DRAM. The R/C signal is used so that the addresses that are output when the CPU accesses the frame memory undergo time division inside IC29 to the RAS address and CAS address which are the DRAM addresses.

During "H" level the lower 10 bits of the CPU address become the RAS address. During "L" level the middle address 10 bits of the CPU address (and a composite of IC30) are the CAS address for supply from IC29 to the DRAM.

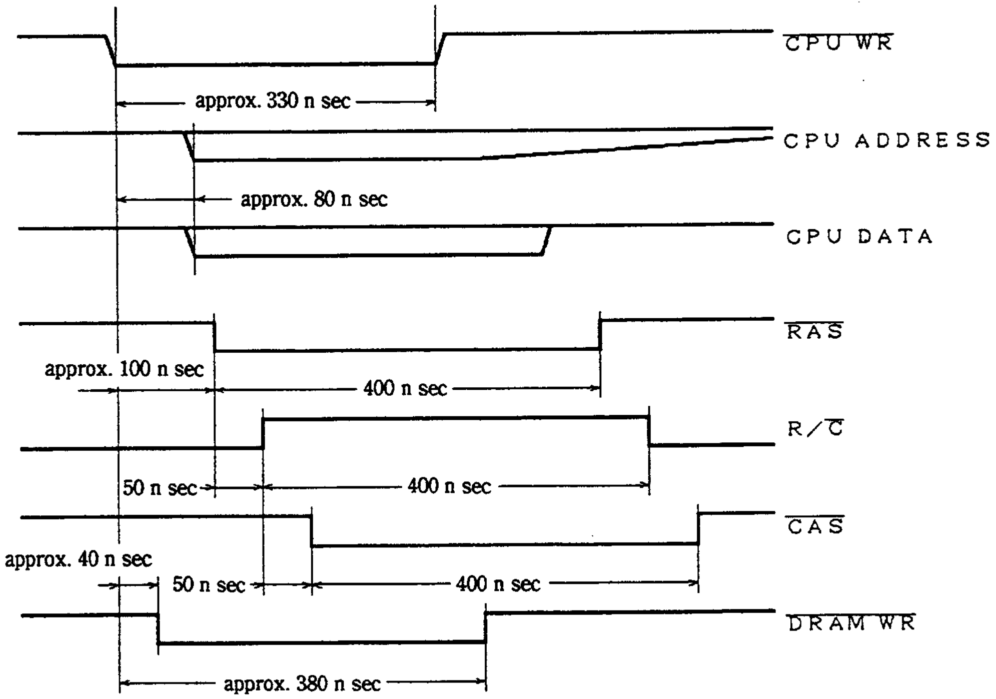

$\overline{\text{CPU WR}}$
approx. 330 n sec
CPU ADDRESS
approx. 80 n sec
CPU DATA
$\overline{\text{RAS}}$
approx. 100 n sec
400 n sec
$R/\overline{C}$
50 n sec
400 n sec
$\overline{\text{CAS}}$
approx. 40 n sec
50 n sec
400 n sec
$\overline{\text{DRAM WR}}$
approx. 380 n sec

Fig. 4-11 Timing for writing character data from the CPU to the DRAM

• MMU operation during H blanking

During the H Blanking period (but not including the V Blanking period) the CPU releases a bus and stops its function as CPU. When the bus is released a $\overline{\text{BACK}}$ signal is output from the CPU so that IC30 (gate array) occupies the bus instead of the CPU. The gate array is programmed from the CPU during the usual picture area period of H and executes the contents that have been programmed at the time the bus is occupied. Execution of the programmed contents include DRAM refresh and data transfer (DMA) to the print circuits, initial setting of addresses for the high-speed page mode operation of the DRAM. These are functions so that processing is in time with the CPU speed.

For data transfer, print data is transferred from the DRAM via the SRAM and MASKING blocks to the head controller of the SY-9 Board.

The gate array outputs during H Blanking a maximum of 8 addresses of frame memory addresses (23 bits) of the printing position. There is then output of a maximum of 8 forms of data from the memory. Although the refresh operation is basically the same as data transfer, it differs in that the transfer clock synchronized with the data is not output from the gate array. The transfer clock is described in the section on the Masking Block. For the initial setting of the address corresponding to the DRAM high-speed page mode, immediately after outputting a maximum of 8 addresses consisting either of refresh address or data transfer address, the high-speed page mode state address is output and is maintained until the $\overline{\text{MEMO HDL}}$ signal goes to "H".

The high-speed page mode is described in the section on the DRAM control block.

Figure 4-12 shows the timing for this process.

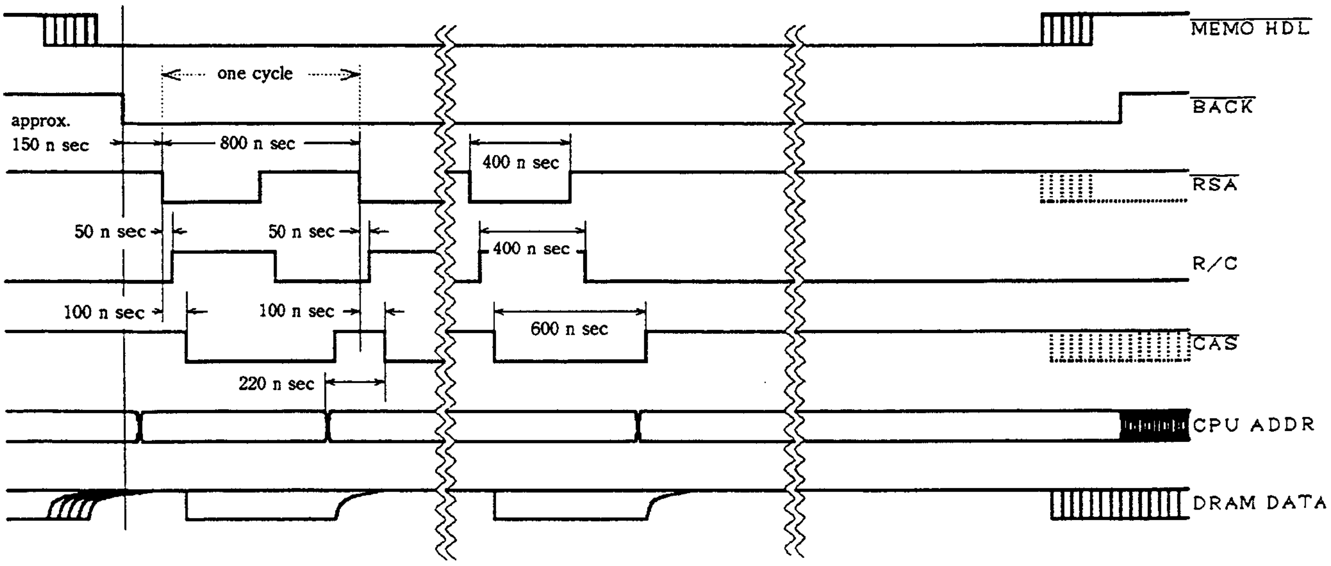
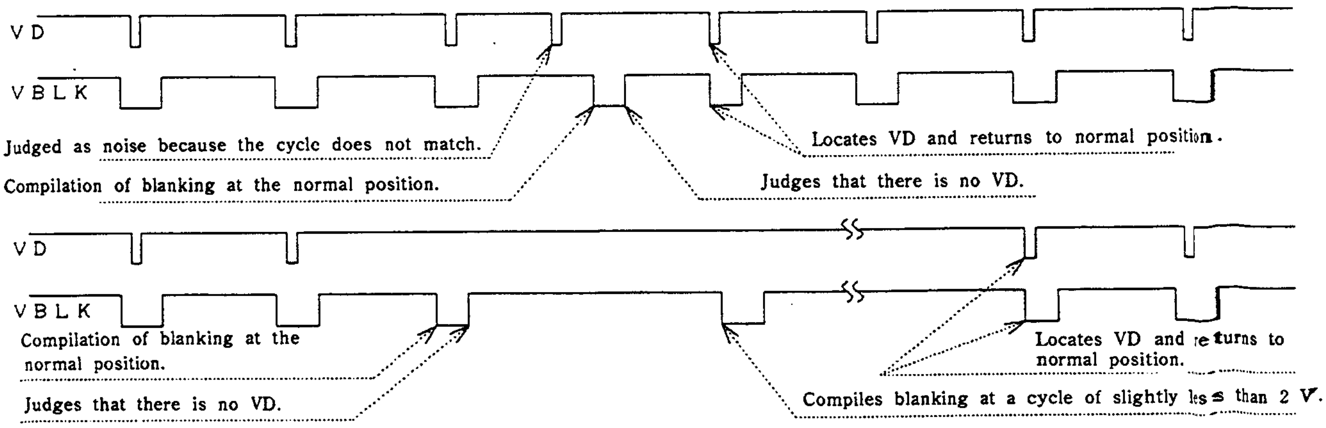


Fig. 4-12 MMU Operation in H Blanking Timing Chart

4-6-3. Sync Control

In the MMU Block, Sync is treated as an important control signal.
Because there is AFC in the CPU, there are no cases of the VD signal not operating. However, this situation can cause faulty operation or failure to operate regarding the HD signal.
A horizontal synchronizing signal is supplied from the VA-26 Board to the MMU block as the HD signal. This signal includes an internal HD signal that is used when outputting the memory screen to the monitor and an external HD signal used when outputting the input source to the monitor. There is switching between these two types in the VA-26 Board to supply the signal. Regarding the external HD signal, there are various situations that are possible for cycle, sag, noise, etc. As a result, use is made in the VA-26 board signal of an HD signal that has been passed through an AFC. If this AFC is not adjusted properly it is not possible to insure operation of the MMU.
The HD signal that is supplied becomes the $\overline{\text{SW'D-HD}}$ signal which is supplied to the CPU for Vf judgment.
In addition, there is creation of an H-Blanking signal known as HDL which is used for mode changing and timing adjustment in the MMU block. There are two types of HDL signal which have slightly different phases. These receive the names $\overline{\text{MEMO-HDL}}$ signal which does not function during V Blanking and the $\overline{\text{SW'D-HDL}}$ signal which functions as an HDL signal even during V Blanking.
These two signals are used differently in the MMU block. The $\overline{\text{SW'D-HDL}}$ signal is used as the timing signal when the CPU releases a bus to the gate array. The $\overline{\text{MEMO-HDL}}$ signal is used for the timing by which the gate array can occupy the bus and for the timing at the end point.
A vertical synchronizing signal is supplied from the VA-26 Board to the MMU block as the VD signal. This signal includes an internal VD signal that is used when outputting the memory screen to the monitor and an external VD signal when outputting the input source to the monitor. There is switching between these two in the VA-26 Board to supply the signal. AFC for the VD signal differs from that for the HD signal because it is carried out with the CPU software. A VD signal with AFC is used as the $\overline{\text{VBLK IN}}$ signal. This is used as the V blanking signal. It is synchronized with the horizontal synchronizing signal in IC4 of the Sync circuit and becomes the $\overline{\text{VBLK}}$ signal.
The VD signal input to the CPU undergoes phase comparison with the $\overline{\text{SW'D-HD}}$ signal in the CPU and Vf (frame judgment) is determined. This Vf judgment is of a design that the coherence is not disturbed even when there is a certain amount of jitter in the synchronizing signal. Thus, there is no chance of ODD and EVEN being confused. Also, because there is AFC there will be no false operation even when noise is mixed in with the VD signal or when there is momentary cutting of the signal. However, if the VD is cut or if the cycle changes, there is generation in the CPU of a hypothetical VD at a cycle of slightly less than 2 V and there is output of blanking corresponding to this. (Please refer to figure 4-13.)



Judged as noise because the cycle does not match.

Compilation of blanking at the normal position.

Locates VD and returns to normal position.

Judges that there is no VD.

Compilation of blanking at the normal position.

Judges that there is no VD.

Locates VD and returns to normal position.

Compiles blanking at a cycle of slightly less than 2 V.

Fig. 4-13 Relationship Between VD and V Blanking

4-7. DRAM Control Block

4-7-1. General

IC29 performs the DRAM control.
Refer to the manual for the UP-5000 Series for an internal description of IC29.
A DRAM differs from a SRAM and other memories because its operation is somewhat more complex. Because it is a memory, it has a data bus and an address bus. The address bus uses time division to transmit information on the RAS address (vertical address in relation to video image) and the CAS address (horizontal address in relation to video image). These time division signals are an $\overline{\text{RAS}}$ and $\overline{\text{CAS}}$ signal. The RAS address is latched inside the DRAM at the rise-fall edge of the $\overline{\text{RAS}}$ while the CAS address is latched at the rise-fall edge of the $\overline{\text{CAS}}$ signal. There are many ways in which these two signals are used. In the UP-5100 Series there are the following three usage modes.

1) High-speed page mode (read cycle, early write cycle)
2) Random access mode (read cycle, early write cycle)
3) RAS only refresh mode

4-7-2. High-speed page mode (read cycle, early write cycle)

In the high-speed page mode, the CAS address is changed after first latching the RAS address. In this case, the RAS address does not change, only the CAS address changes. The high-speed page mode is used during the H usual picture area period [However, only when accessing the DRAM, for example, during monitor out of an image stored in the DRAM (frame memory)].

4-7-3. Random (read cycle, early write cycle)

Although the entry says Random Access Mode, this refers to the normal read mode and early write mode. Both the RAS and CAS addresses are designated for each single point in the frame memory. This is used when writing captions, writing the service man mode patterns, transmitting print data or during refresh (no DRAM refresh mode).

4-7-4. RAS only refresh mode

The RAS only refresh mode is used to initialize the DRAM immediately following power source rise. With the 2M DRAM and 4M DRAM (PAL-2 FRAME models) it is necessary to refresh all RAS a minimum of 8 times as initialize prior to operating the DRAM. As a result, when the power is ON, RAS only refresh is carried out.
These three modes are shown in Figures 4-4 to 4-16. The timing charts show examples that have been used with the circuit.

Mode in use	Mode description	Contents that are used
High-speed page mode	Possible to access the CAS coordinates without changing the RAS coordinates. The RAS coordinates are first designated and then the CAS coordinates are designated in succession.	Used to access the DRAM during H usual picture area. This is used because image sampling is in a horizontal direction. the RAS coordinates are fixed within 1H and because it is faster.
Random Access Mode	It is possible to separately give the RAS coordinates and CAS coordinates AND randomly access the memory space. As opposed to the above mode, the access is slower since the RAS coordinats are supplied.	This is used for vertical sampling during data transmission with H blanking or retaining DRAM data (refresh). This mode is also used for caption input. etc.
RAS only Rehresh Mode	This mode, which is used for refreshing the DRAM. is one of serveral methods. Only the RAS coordinates are supplied and not the CAS coordinates.	After turning the power ON. it is necessary to initialize the DRAM. This mode is required for one of these methods. It accesses all RAS coordinates 8 times.

Table. 4-4 Description of DRAM Modes

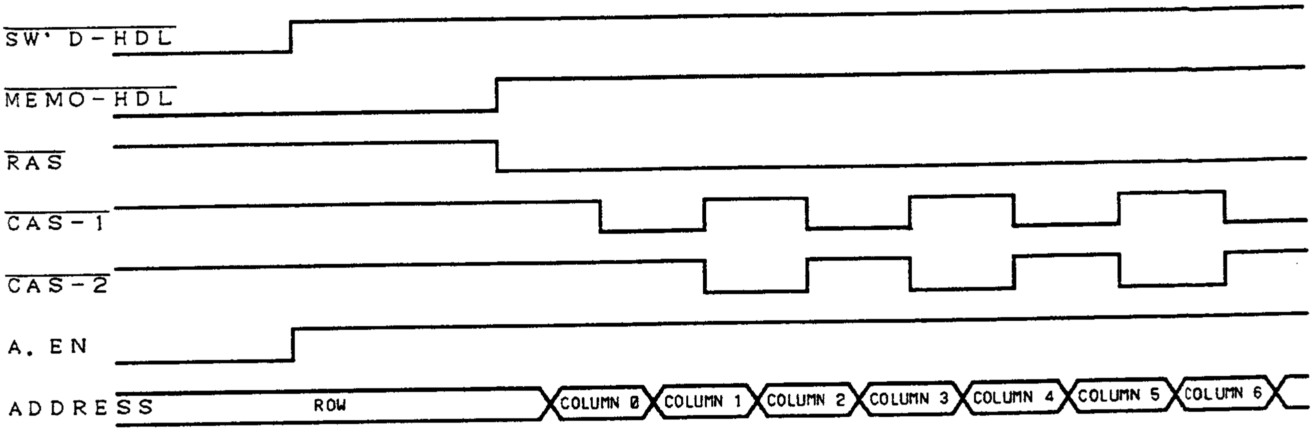

SW' D-HDL
MEMO-HDL
RAS
CAS-1
CAS-2
A. EN
ADDRESS
ROW
COLUMN 0
COLUMN 1
COLUMN 2
COLUMN 3
COLUMN 4
COLUMN 5
COLUMN 6

Fig. 4-14 Movement of signals during the high-speed page mode

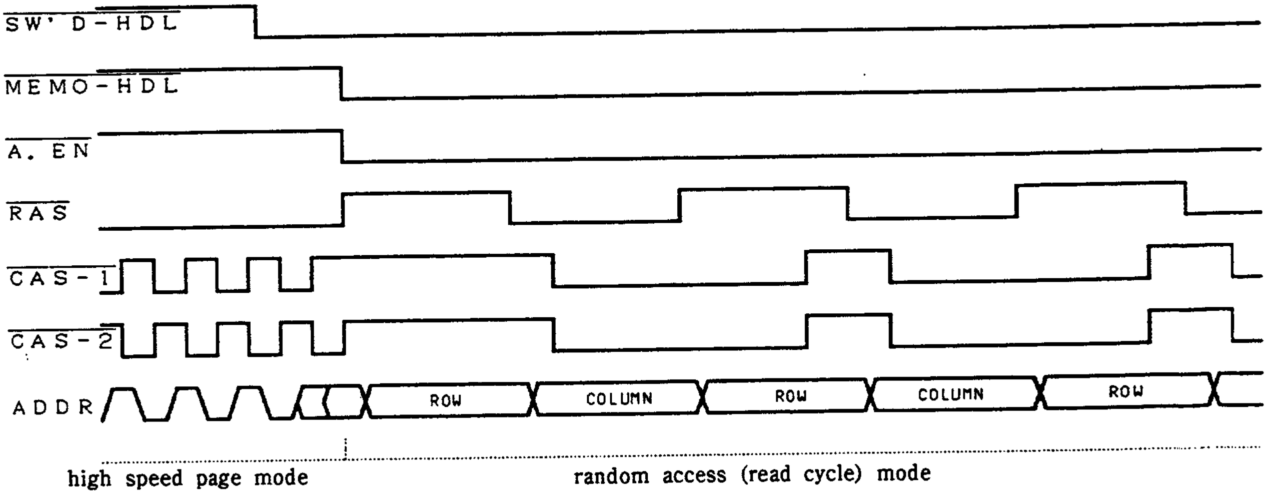

SW' D-HDL
MEMO-HDL
A. EN
RAS
CAS-1
CAS-2
ADDR
ROW
COLUMN
ROW
COLUMN
ROW
high speed page mode
random access (read cycle) mode

Fig. 4-15 Movement of signals during random access

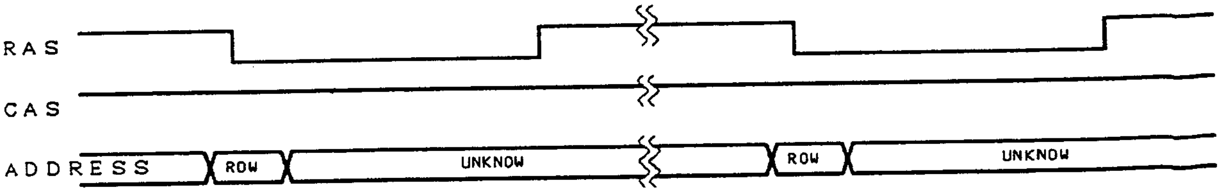

RAS
CAS
ADDRESS
ROW
UNKNOW
ROW
UNKNOW

Fig. 4-16 Movement of signals during RAS only refresh

4-8. Select/Masking Block

Figure 4-17 shows the equalizing circuit of this block. The circuit is composed of 2 gate arrays (2 varieties), 3 MASK-ROM's (3 varieties) and one 8-bit latch IC1.

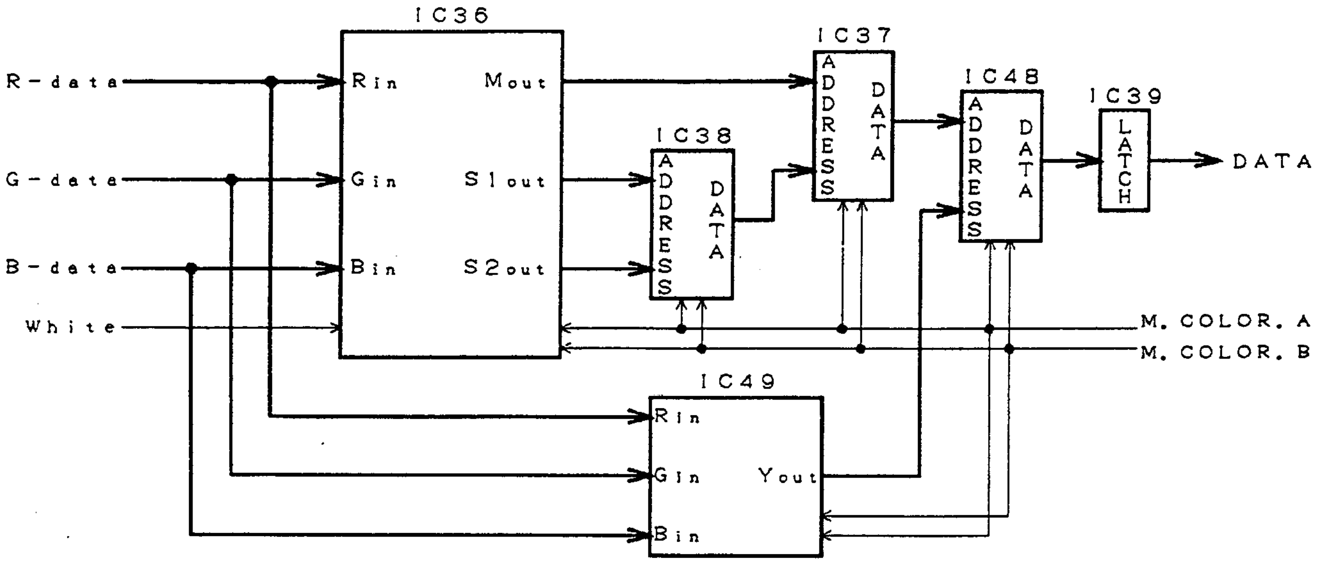

R-data
G-data
B-data
White
IC36
Rin
Gin
Bin
Mout
S1out
S2out
IC37
ADDRESS
DATA
IC38
ADDRESS
DATA
IC48
ADDRESS
DATA
IC39
LATCH
DATA
M. COLOR. A
M. COLOR. B
IC49
Rin
Gin
Bin
Yout

Fig. 4-17 Equalizing Circuit of the Select/Masking Block

IC36 divides the R・G・B data into Main color and Sub color according to the color information (M. COLOR. A, B) to be printed. Chart 3-5 shows the relationship among print color, main color and sub-color.

Color to be printed	Signal to become main color	Signal to become Sub1 color	Signal to become Sub2 color	M. COLOR(A, B)
Yellow	$\overline{B}$	$\overline{R}$	$\overline{G}$	(1, 0)
Magenta	$\overline{G}$	$\overline{B}$	$\overline{R}$	(0, 1)
Cyan	$\overline{R}$	$\overline{B}$	$\overline{G}$	(1, 1)
Black	$\overline{G}$	$\overline{B}$	$\overline{R}$	(0, 0)

Table. 4-5 Relationship between print color and main/sub color

The video data selected for each signal as shown in table 4-5 is input to IC37 and IC38 from IC36. These two Mask ROM's are used as basic masking ROM's. They include maps for elimination and calculation of unnecessary elements for the print coloring materials and for making calculations to improve color from visual inspection. IC48 is a brightness masking ROM which has the function of increasing the color reproduction of blue. IC49 carries out the task of calculating the blue brightness data and sending this to IC48. The data output IC48 via this type of path signifies the transfer energy of the pigment during printing. This energy data is converted into transfer time data in the γROM of the SY-9 Board, undergoes various types of image processing and is transferred to the thermal head as current time data.
The output data from IC49 displays indefinite data period due to propagation and delay of the three masking ROM's. In consideration also of the timing margin in the circuit of the SY-9 Board, data is latched at IC39 so that there is no indefinite data period. This IC latch clock is output from IC30 (MMU Block). However, because this has been programmed in a way that considers the delay phase suitable to the FMY circuit sequence, the most suitable phase is provided.
The IC39 output data is output to the SY-9 Board with a clock that is synchronized to the data.
When the CPU (IC28) receives a Data Enable signal from the SY-9 Board, the print data is transferred from the DRAM via this block together with output of a clock (known either as WRP or DATA CLK) synchronized with the data for transfer to the SY-9 Board. (Refer to figure 4-18.)

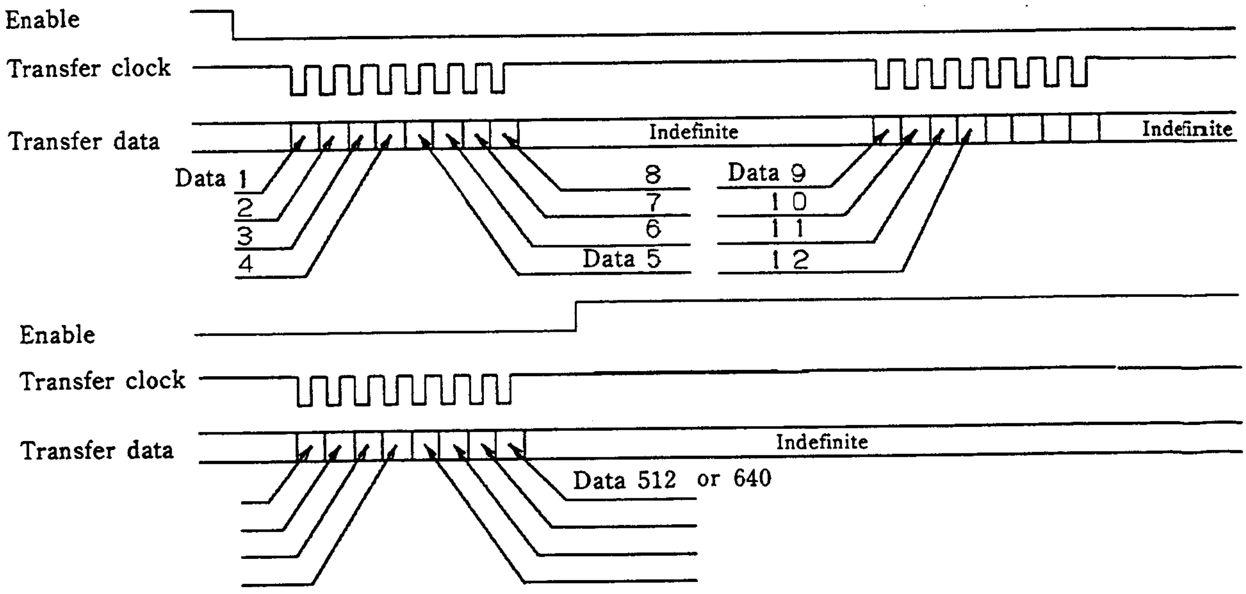


Fig.4-18 Transfer of Printing Data

The H usual picture area time is the period when the data is cut off. During the H usual picture area period there is no transfer of data. Please refer to the description of the MMU Block.
For NTSC specifications, the total data count is 512 (UP-5100, 5200MD Series), for PAL specifications the total data count is 640 (UP-5200MDP Series).

4-9. SYNC Block

In addition to gate array (IC14 and IC5), and delay line (IC6) and XOR (IC25), this is composed of a crystal (X1), etc. This circuit is the same as that in the UP-5000. Refer to the information for that model.

X1 is a 14.31818 MHz crystal for NTSC specifications (UP-5100, 5200MD Series) and a 14.1875 MHz crystal for PAL specifications (UP-5200MDP Series). IC5 is used to synchronize the X1 oscillation clock H and uses output from the Pin 5. Although we speak in terms of synchronous, there are actually several clocks in which the oscillation clock is slightly delayed in the IC in order to select at the right time the clock that matches the HD phase.

The clock output from IC5 is used as a sampling clock. This signal is divided into two, one signal is input to IC4 and the other is input to the IC6 delay lie.

Inside IC4 this clock is used for generation of the CAS signal during the H usual picture area period (high-speed page mode) and for phase adjustment of H blanking (HDL signal). As was explained for the A/D and D/A blocks, the signal input to IC6 is used as an analog/digital conversion clock.

IC4 is used to generate the CAS signal during the H usual picture area period (high-speed page mode) and for generation of H blanking (HDL signal). Regarding the CAS signal there is generation of two CAS signals ($\overline{\text{CAS1}}$, $\overline{\text{CAS2}}$) in which the phase differs by 180 degrees. These each normally function at 2 fsc (approx. 7 MHz). When using SPLIT-4/9 to store to the memory, the signals undergo thinning out before being output. During HDL generation there is generation of two types of signals, $\overline{\text{MEMO-HDL}}$ and $\overline{\text{SW'D-HDL}}$. The $\overline{\text{SW'D-HDL}}$ signal is used by the CPU of the MMU block for releasing the bus and other tasks.

These HDL signals make it possible to program the phase in relation to the fall of the input HD. The terminals include HDL-ADJ 1 to 11 and HDL-SET 1 to 9. Phase adjustment is carried out by combining the numerical values input to the terminals.

(For details refer to the description of UP-5000.)

4-10. Signals flow in the various operation modes

4-10-1. General

Figure 4-20 is the total block diagram of the FMY-8 Board.
The description makes use of the block diagram in Figure 4-20 as the basis for describing the flow of signals for each operational mode.
The operational modes of the FMY-8 Board can be divided into the 7 modes shown below.

1) Input Mode (Monitor out of input signal)
2) Memory In Mode (Stores input signals in the frame memory)
3) Memory Mode (Monitor out of signals in memory)
4) Dram Refresh Mode (Retention of frame memory data)
5) Print Data Transfer Mode (Transfer of print data to SY-9 Board)
6) Caption Writing Mode (Writing of data to frame memory)
7) Palette Writing Mode (Writing of data to palette RAM)

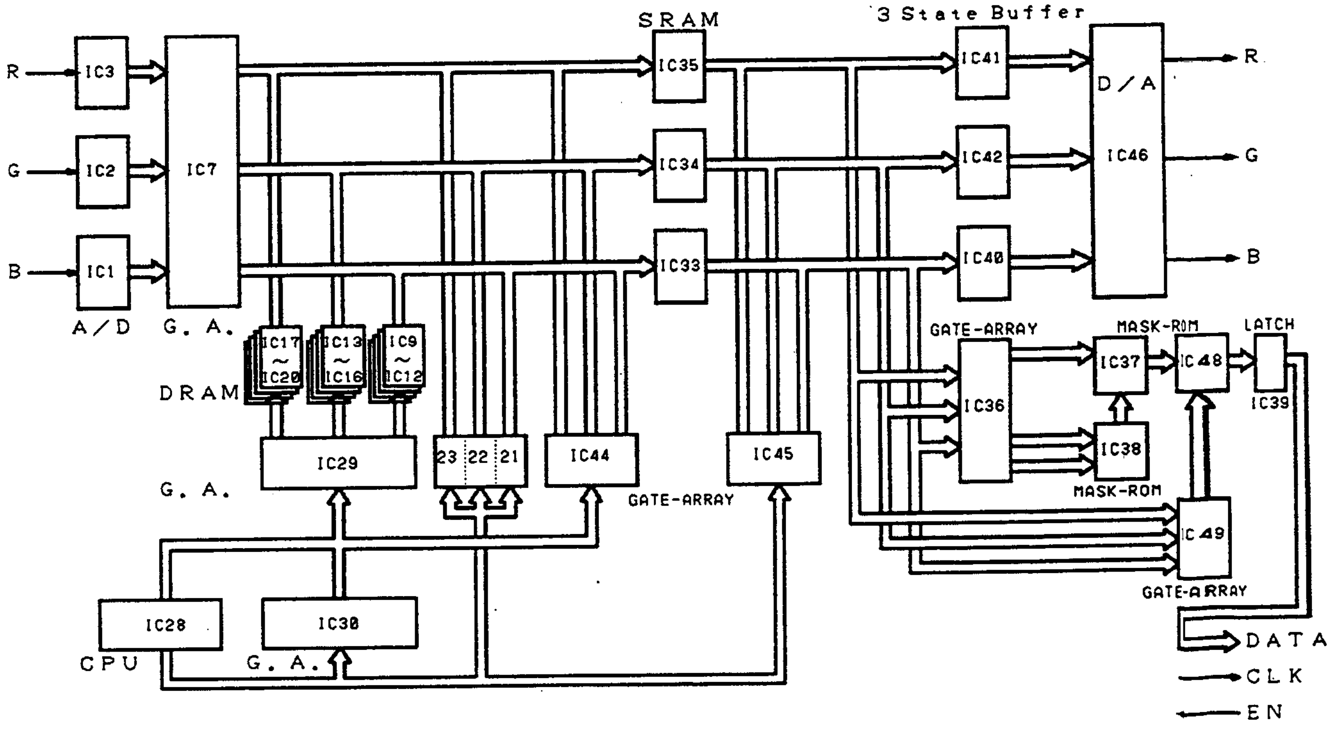

R
G
B
IC3
IC2
IC1
A/D
IC7
G. A.
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
DRAM
IC29
G. A.
23 22 21
IC44
IC45
GATE-ARRAY
SRAM
IC35
IC34
IC33
3 State Buffer
IC41
IC42
IC40
D/A
IC46
R
G
B
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
IC28
CPU
IC30
G. A.
DATA
CLK
EN

Fig. 4-20 Total Block Diagram (FMY-8 Board)

4-10-2. Input Mode

This mode is used to output the input signals to the monitor via the FMY-8 Board. R·G·B analog signals input from the VA-26 Board undergo A/D conversion to become 8 bit digital signals.

These signals pass through a Palette-SRAM where the color and contrast can be changed, and then undergo D/A conversion to return them to analog signals which are sent to the VA-26 Board.

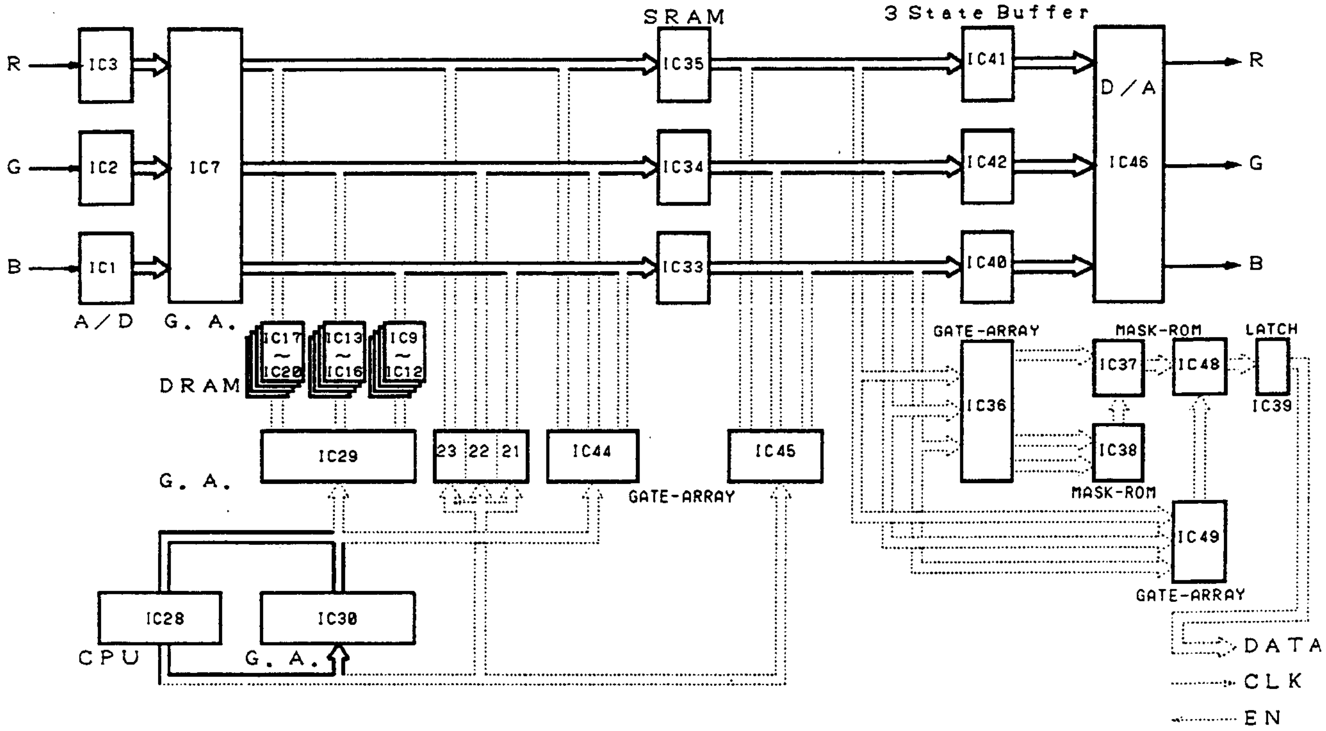

R
G
B
IC3
IC2
IC1
A/D
IC7
G. A.
DRAM
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
IC29
G. A.
23
22
21
IC44
IC45
GATE-ARRAY
IC28
CPU
IC30
G. A.
SRAM
IC35
IC34
IC33
3 State Buffer
IC41
IC42
IC40
D/A
IC46
R
G
B
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
DATA
CLK
EN

Fig. 4-20 Monitor out of input signals

4-10-3. Memory In Mode

This is the mode for storing input signals in the frame memory.
R·G·B analog signals input from the VA-26 Board undergo A/D conversion to become 8 bit digital signals.
These signals are input to the DRAM although a CAS address is supplied from IC29 (DRAM controller) in order to synchronize them with the A/D conversion clock.
IC29 is programmed from IC30 (IC composed of MMU) during the H blanking period.

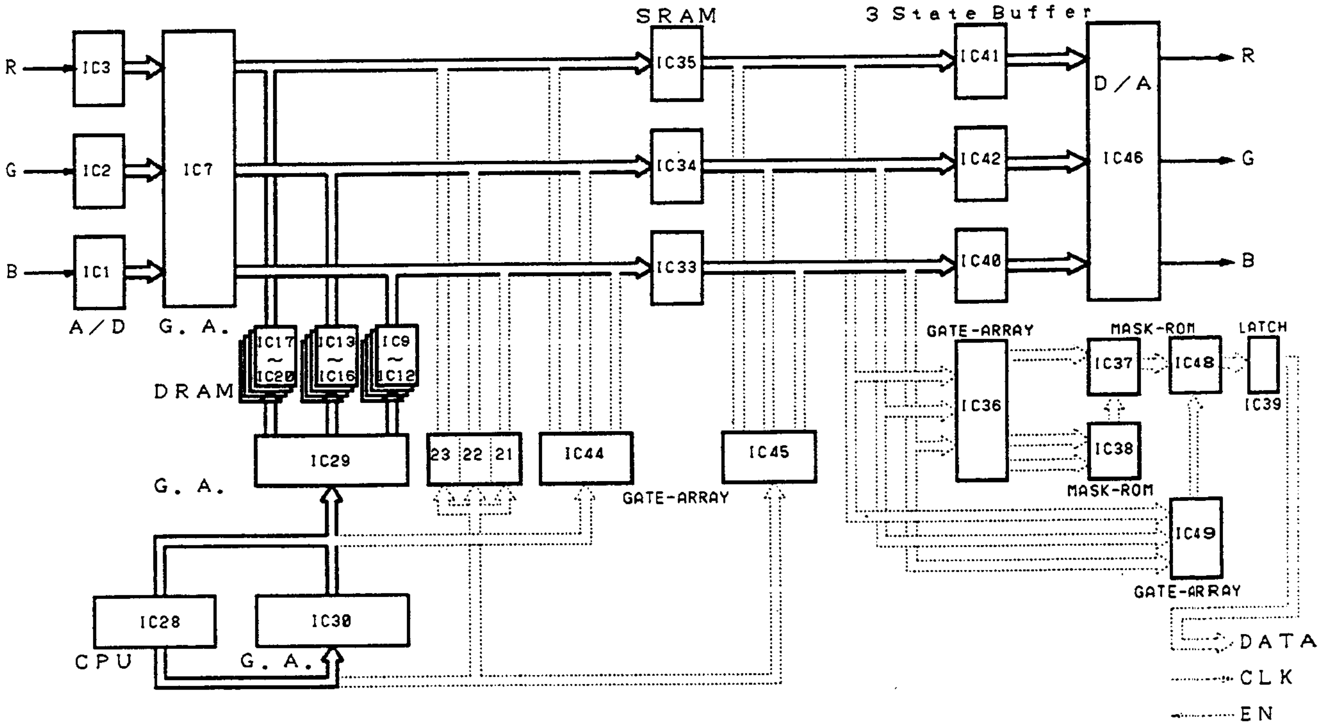
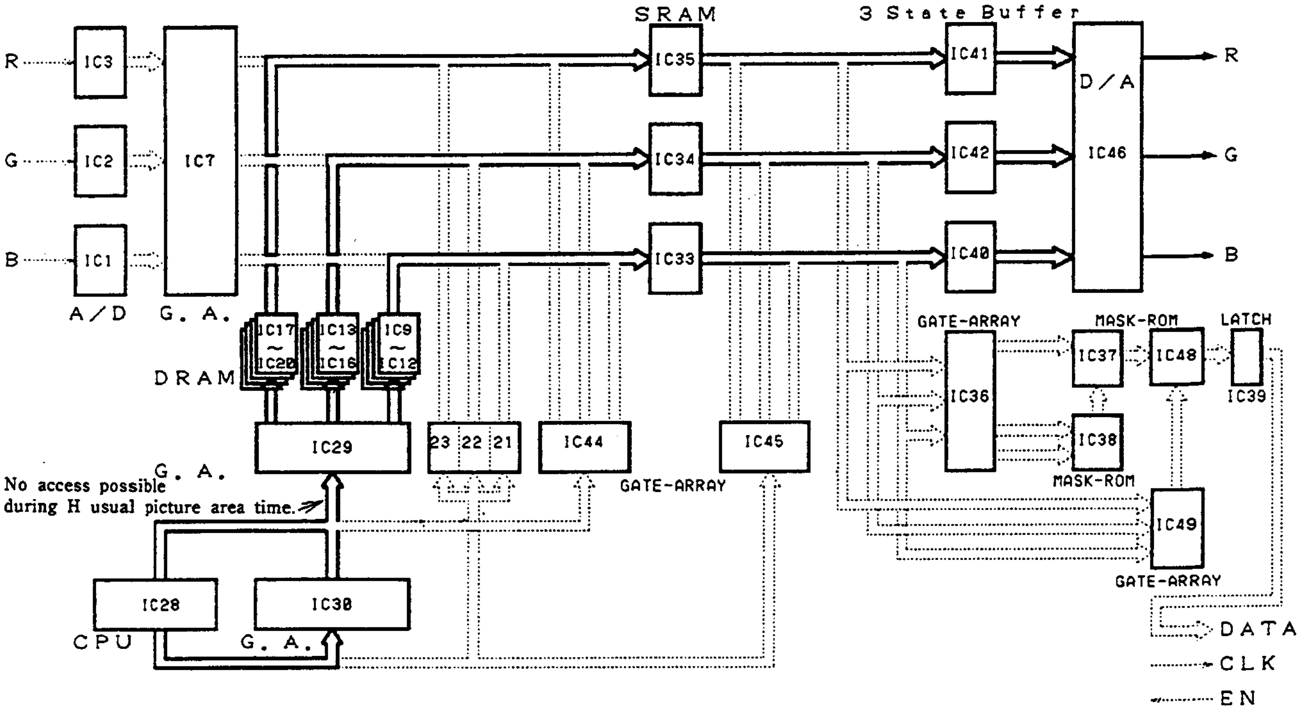

SRAM
3 State Buffer
R
G
B
IC3
IC2
IC1
IC7
A/D
G. A.
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
DRAM
IC29
G. A.
23 22 21
IC44
GATE-ARRAY
IC45
IC28
IC30
CPU
G. A.
IC35
IC34
IC33
IC41
IC42
IC40
D/A
IC46
R
G
B
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
DATA
CLK
EN

Fig. 4-21 Flow of signals during memory in

4-10-4. Memory Mode

This mode is used to output at video rate the video data that is stored in the frame memory and to carry out monitor out.

The digital video signals output from the frame memory (DRAM) pass through a Palette-SRAM where the color and contrast can be changed. They undergo D/A conversion to convert them back into analog video signals which are sent to the VA-26 Board.


R
G
B
IC3
IC2
IC1
A/D
IC7
G. A.
SRAM
IC35
IC34
IC33
3 State Buffer
IC41
IC42
IC40
D/A
IC46
R
G
B
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
DRAM
IC29
G. A.
23
22
21
IC44
GATE-ARRAY
IC45
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
IC28
CPU
IC30
G. A.
DATA
CLK
EN

No access possible during H usual picture area time.

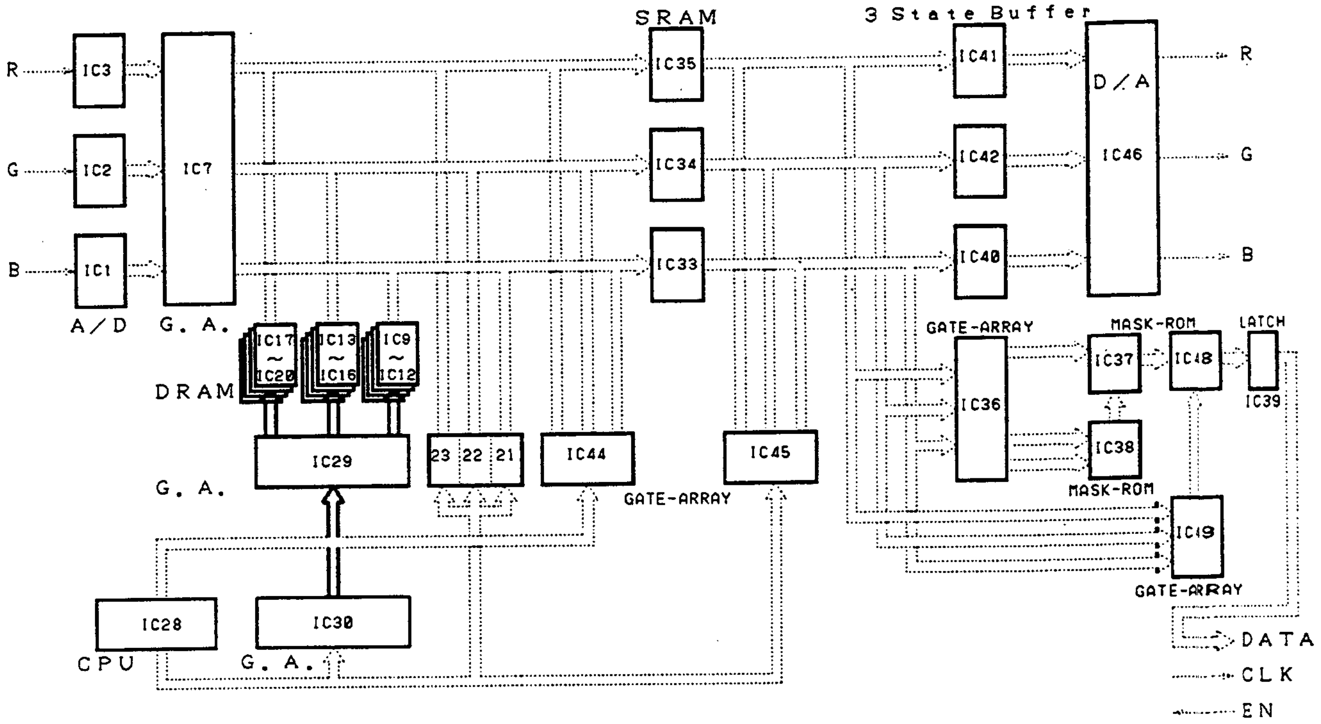
Fig. 4-22 Monitor out of images that have been stored in the memory.

4-10-5. Refresh Mode

Unless the DRAM accesses all RAS addresses during a fixed period, it is not possible to retain the data it is holding. For the DRAM's used in this device, the 1M DRAM must access 512 addresses within 8 msec and the 2M/4M DRAM must access 512/1024 addresses (RAS) within 16 msec.

At the FMY-8 circuit board, the 8-bit address that is connected in the RAS direction during the H blanking period is accessed.

Although this differs from the DRAM refresh mode, the purpose is the same, retention of the DRAM data. Also, although the DRAM data is output on a bus, it has no meaning.



R
G
B
IC3
IC2
IC1
A／D
IC7
G. A.
SRAM
IC35
IC34
IC33
3 State Buffer
IC41
IC42
IC40
D／A
IC46
R
G
B
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
DRAM
IC29
G. A.
23 22 21
IC44
GATE-ARRAY
IC45
GATE-ARRAY
IC36
MASK-ROM
IC37
IC38
MASK-ROM
IC18
LATCH
IC39
IC19
GATE-ARRAY
IC28
CPU
IC30
G. A.
DATA
CLK
EN

Fig.4-23 DRAM Refresh Mode (during H blanking)

4-10-6. Print Data Transfer Mode

This has the same operation as the former refresh mode. The only difference is that the printed data is output to the SY-9 Board with the related signal.
During H blanking period there is access of a maximum of 8 dots of addresses in the RAS direction. This is true when the figure is less than 8 bits.

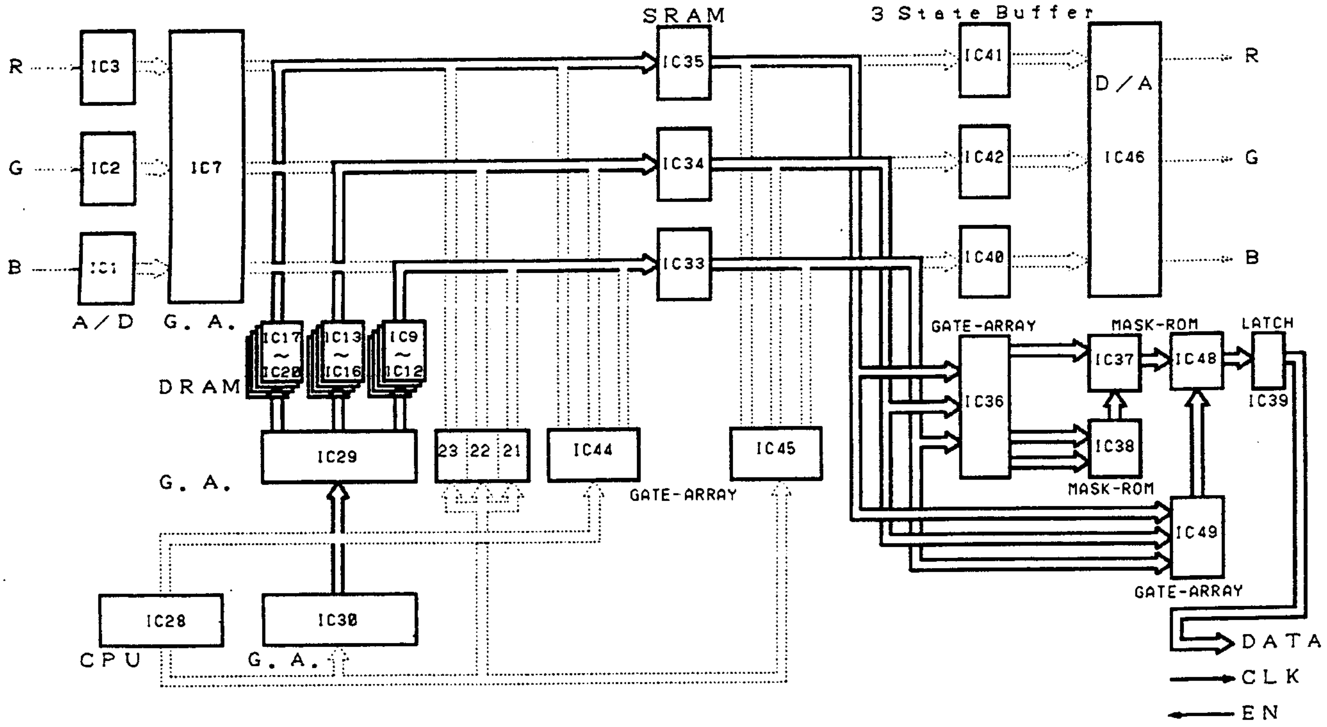
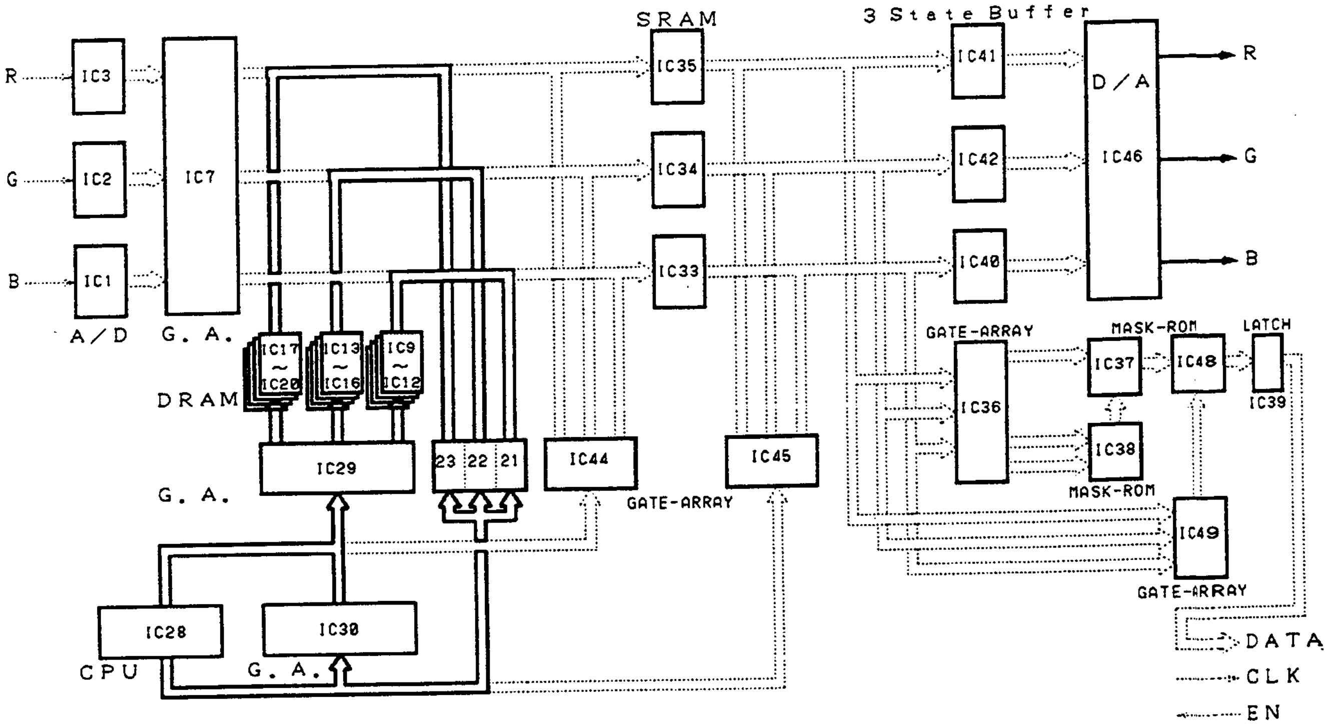

SRAM
3 State Buffer
R
G
B
IC3
IC2
IC1
IC7
A/D
G. A.
IC35
IC34
IC33
IC41
IC42
IC40
D/A
IC46
R
G
B
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
DRAM
IC29
G. A.
23
22
21
IC44
GATE-ARRAY
IC45
IC28
CPU
IC30
G. A.
DATA
CLK
EN

Fig. 4-24 Flow of signals during transfer of print data

4-10-7. Caption Writing Mode

With the UP-5100/5200MD/5200MDP Series, the captions are written to the frame memory. This caption data is written to the DRAM during V blanking.

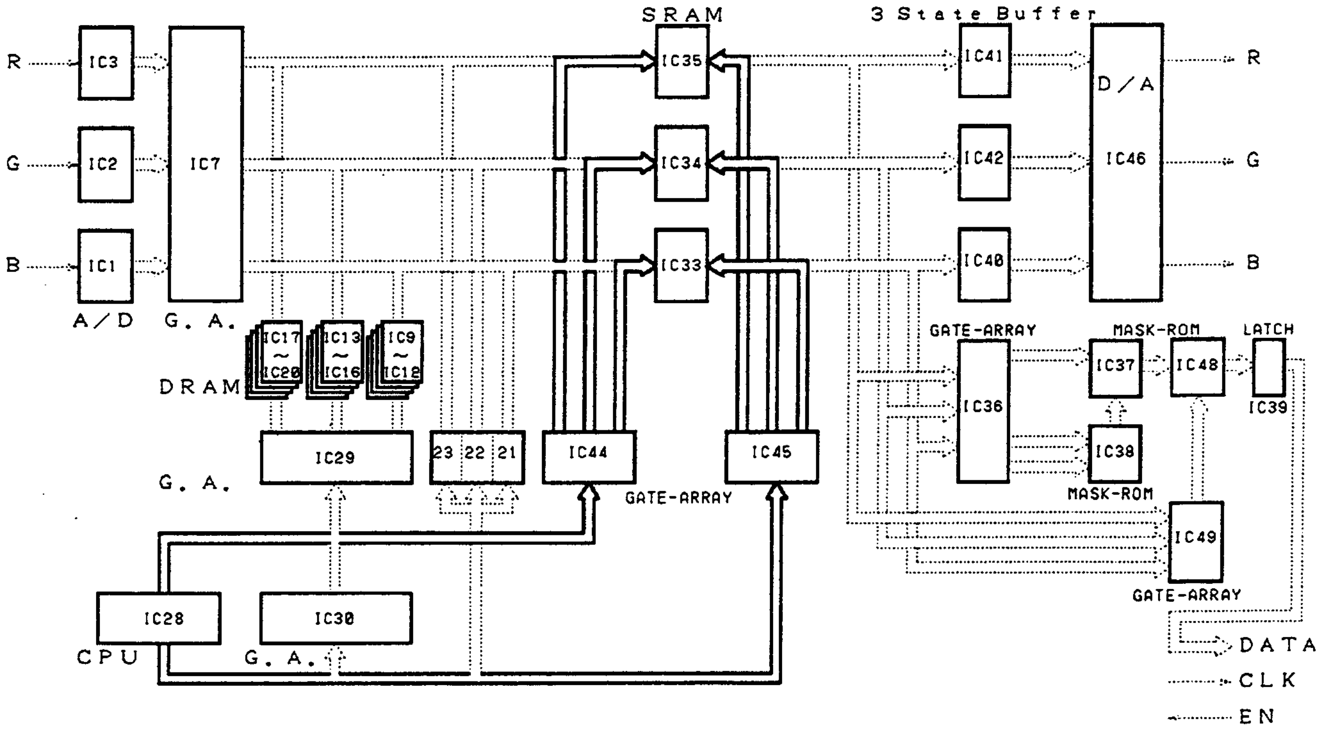


SRAM
3 State Buffer
R
G
B
IC3
IC2
IC1
A/D
IC7
G. A.
IC35
IC34
IC33
IC41
IC42
IC40
D/A
IC46
R
G
B
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
DRAM
IC29
G. A.
23
22
21
IC44
IC45
GATE-ARRAY
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
IC28
CPU
IC30
G. A.
DATA
CLK
EN

Fig. 4-25 When writing captions to the DRAM (during V Blanking)

4-10-8. Palette Writing Mode

With the UP-5100/5200MD/5200MDP Series, it is possible to adjust color after storage in the memory. This color adjustment is made possible by rewriting the data in the Palette-SRAM and is carried out during V Blanking.



R
G
B
IC3
IC2
IC1
A/D
IC7
G. A.
IC17 ~ IC20
IC13 ~ IC16
IC9 ~ IC12
DRAM
IC29
G. A.
23
22
21
IC28
CPU
IC30
G. A.
SRAM
IC35
IC34
IC33
IC44
IC45
GATE-ARRAY
3 State Buffer
IC41
IC42
IC40
D/A
IC46
R
G
B
GATE-ARRAY
IC36
MASK-ROM
IC37
IC48
LATCH
IC39
IC38
MASK-ROM
IC49
GATE-ARRAY
DATA
CLK
EN

Fig. 4-26 When changing the color palette data (during V Blanking)

5. SYSTEM CONTROL (SY-9 BOARD)

5-1. General

The SY-9 Board is composed of the following three functions.

1) System Control
2) Mechanism Control
3) Head Control

Figure 5-1 shows the flow of signals in the SY-9 Board.

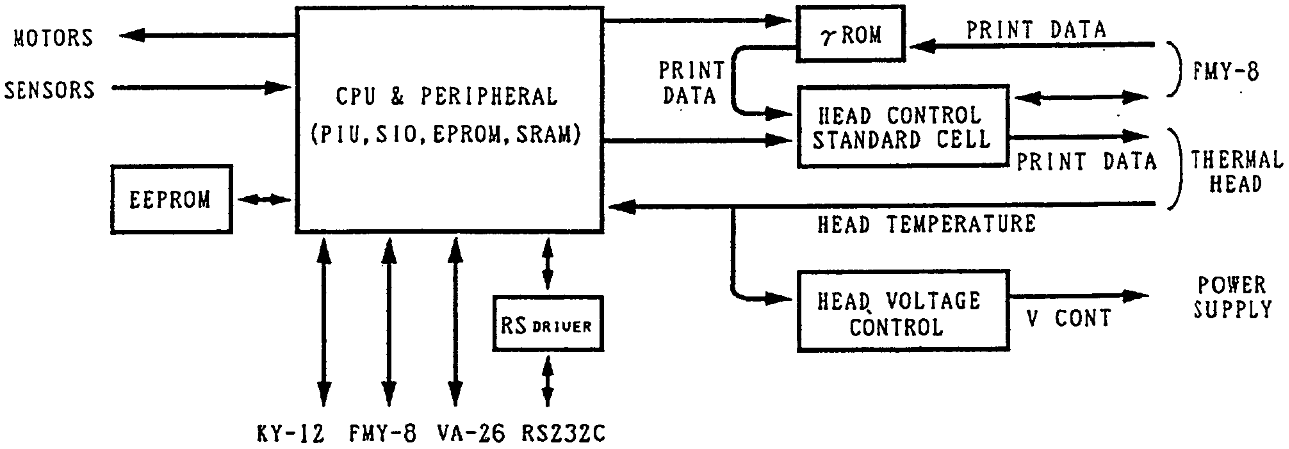

MOTORS
SENSORS
EEPROM
CPU & PERIPHERAL
(PIU, SIO, EPROM, SRAM)
PRINT
DATA
γ ROM
PRINT DATA
FMY-8
HEAD CONTROL
STANDARD CELL
PRINT DATA
THERMAL
HEAD
HEAD TEMPERATURE
HEAD VOLTAGE
CONTROL
V CONT
POWER
SUPPLY
RS DRIVER
KY-12
FMY-8
VA-26
RS232C

Fig. 5-1 The flow of signals in the SY-9 Board

5-2. CPU and Peripheral Circuits

This is composed of a CPU (ICI: uPD78310A), a program-use EPROM (IC4: AM27C512), a SRAM (IC6: CXK5814P) for additional memory, a parallel board PIU (IC2: uPD71055), serial communications board SIO (IC3: MB89371APF), a non-volatile memory for setting memory EEPROM (IC9 and IC10: CXK1005P).

5-2-1. Reset Circuit

The reset circuit uses a reset-use IC (IC18: PST523C). During POWER ON (or When the power is switched off, then immediately on again.) there is output of a 70 msec reset signal. This reset signal is also sent to the FMY-8 Board.

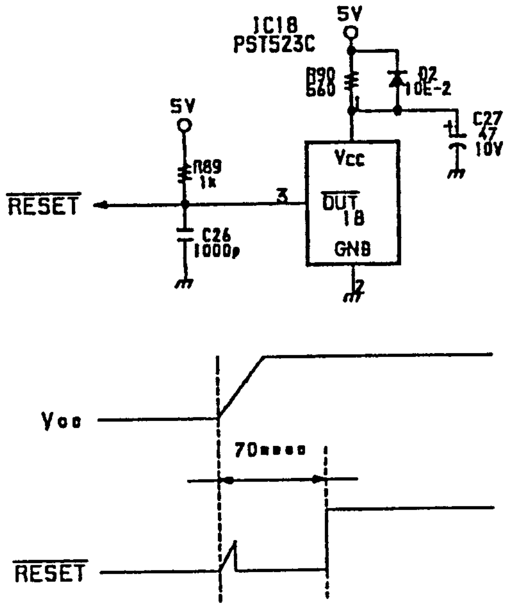

IC18
PST523C
5V
R90
560
D2
10E-2
C27
47
10V
5V
R89
1k
RESET
3
Vcc
OUT
18
GND
2
C26
1000p
Vcc
70msec
RESET

Fig. 5-2 Reset Circuit

5-2-2. External I/O Address Assignment

ADDRESS	EXTERNAL I/O		
0000 ↓ 7FFF	EPROM		AM27C512-205DC (IC4)
8000 ↓ 87FF	SRAM		CXK5814P-35L (IC6)
9000 ↓ 900D	STANDARD CELL		HDC443V2 (IC11)
FFB0	PIU	Port A	uPD71055GB-3B4 (IC2)
FFB1		Port B	
FFB2		Port C	
FFB3		Control	
FFB4 ↓ FFB7	SIO	CH 1	MB89371APF (IC3)
FFB8 ↓ FFBB		CH 2	
FFBC	LATCH		74HC573NS(IC15)
FFBD	BUFFER		SN74HC240NS(IC23)

Table. 5-1

5-2-3. Address Decoder

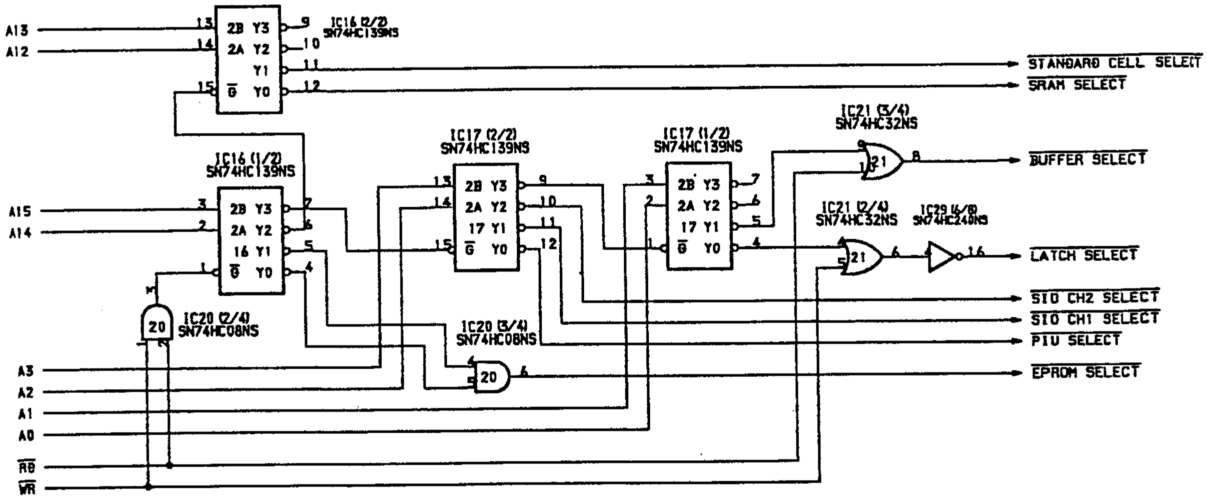

A13
A12
A15
A14
A3
A2
A1
A0
$\overline{RD}$
$\overline{WR}$
IC16 (2/2) SN74HC139NS
IC16 (1/2) SN74HC139NS
IC17 (2/2) SN74HC139NS
IC17 (1/2) SN74HC139NS
IC20 (2/4) SN74HC08NS
IC20 (3/4) SN74HC08NS
IC21 (3/4) SN74HC32NS
IC21 (2/4) SN74HC32NS
IC29 (6/8) SN74HC240NS
2B Y3
2A Y2
17 Y1
16 Y1
$\overline{G}$ Y0
20
21
$\overline{STANDARD\ CELL\ SELECT}$
$\overline{SRAM\ SELECT}$
$\overline{BUFFER\ SELECT}$
$\overline{LATCH\ SELECT}$
$\overline{SIO\ CH2\ SELECT}$
$\overline{SIO\ CH1\ SELECT}$
$\overline{PIU\ SELECT}$
$\overline{EPROM\ SELECT}$

Fig. 5-3 Address Decoder Circuit

5-2-4. CPU (IC1: uPD78310A) Port signal

Port No.	I/O	SIGNAL NAME
P00	0	$\overline{\text{SYS ENABLE}}$ (To KY-12)
P01	0	EEPROM2 INI/$\overline{\text{CS}}$
P02	I	EEPROM1 $\overline{\text{BUSY}}$
P03	I	EEPROM2 $\overline{\text{BUSY}}$
P04	*	EEPROM I/01
P05	*	EEPROM I/02
P06	*	EEPROM I/03
P07	*	EEPROM I/04
P10	0	$\overline{\text{STEP MOTOR DRIVE}}$ 01
P11	0	$\overline{\text{STEP MOTOR DRIVE}}$ 02
P12	0	$\overline{\text{STEP MOTOR DRIVE}}$ 03
P13	0	$\overline{\text{STEP MOTOR DRIVE}}$ 04
P14	0	HEAD MOTOR IN1
P15	0	HEAD MOTOR IN2
P16	0	EEPROM CLOCK
P17	0	EEPROM1 INI/$\overline{\text{CS}}$
P20	I	NMI
P21	I	RIBBON CODE EDGE
P22	I	RS232C RCVRDY
P23	I	MMU RCVRDY
P24	0	TXD (To KY-12)
P25	I	RXD (From KY-12)
P26	I	NTSC/$\overline{\text{PAL}}$
P27	I	KY ENABLE (From KY-12)
P30	I	RIBBON FG
P31	I	NO CONNECT
P32	I	RIBBON FG
P33	I	NO CONNECT
P34	0	RIBBON MOTOR PWM DRIVE
P35	0	FAN MOTOR PWM DRIVE
P36	0	STEP MOTOR VOLT. SW
P37	0	REMOTE2 $\overline{\text{BUSY}}$

Table. 5-2

5-2-5. CPU (IC1: uPD78310A) A/D Input Signal

Port No.	I	SIGNAL NAME
AN0	I	HEAD TEMPERATURE
AN1	I	ROOM TEMPERATURE
AN2	I	NO CONNECT
AN3	I	NO CONNECT

Table. 5-3

5-2-6. PIU (IC2: uPD71055GB-3B4) Port Signal

Port No.	I/0	SIGNAL NAME
PA0	0	$\overline{\mathrm{PRINT}}$
PA1	0	$\overline{\mathrm{PRINT\ START}}$
PA2	0	TIMING PULSE
PA3	0	FAN CONT
PA4	0	NO CONNECT
PA5	0	HALFTONE/$\overline{\mathrm{NORM}}$
PA6	0	RIBBON 1 (γ ROM A10)
PA7	0	RIBBON 2 (γ ROM A11)
PB0	0	M COLOR A (γ ROM A8)
PB1	0	M COLOR B (γ ROM A9)
PB2	0	INPUT SIGNAL SELECT 1
PB3	0	INPUT SIGNAL SELECT 2
PB4	0	INPUT SIGNAL SELECT 3
PB5	0	NO CONNECT
PB6	0	SORCE/$\overline{\mathrm{THROUGH}}$
PB7	0	VCONT OFF/$\overline{\mathrm{ON}}$
PC0	I	PAPER CHECK SENSOR 1
PC1	I	PAPER CHECK SENSOR 2
PC2	I	TRAY SENSOR
PC3	I	RGB/$\overline{\mathrm{YDIF}}$
PC4	I	ENTER JAMING SENSOR
PC5	I	PAPER EDGE SENSOR
PC6	I	HEAD POSITION SENSOR
PC7	I	HOME POSITION SENSOR

Table. 5-4

5-2-7. LATCH (IC15: SN74HC573NS) Output Signal

Port No.	0	SIGNAL NAME
D0	0	NO CONNECT
D1	0	NO CONNECT
D2	0	NO CONNECT
D3	0	γ ROM A12
D4	0	γ ROM A13
D5	0	γ ROM A14
D6	0	γ ROM A15
D7	0	γ ROM A16

Table. 5-5

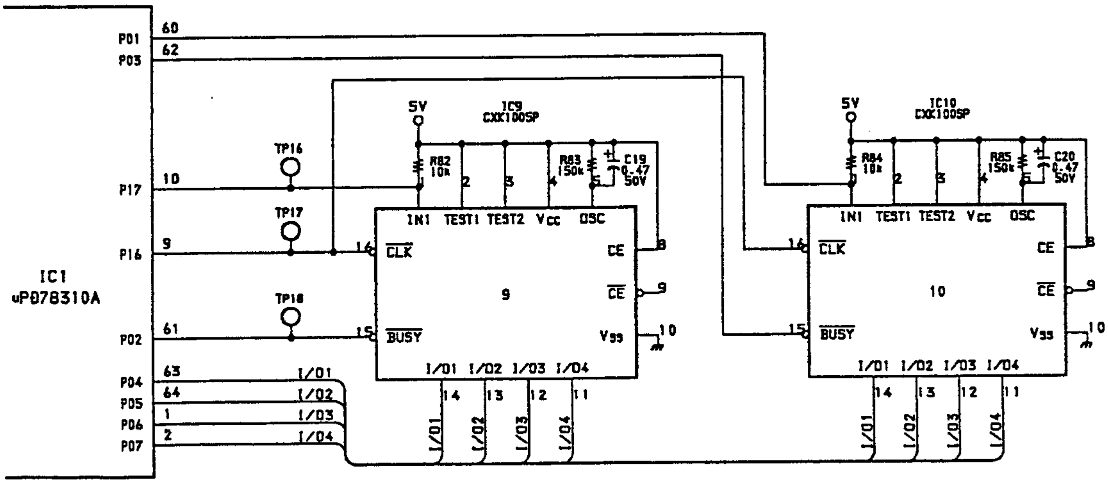
5-2-8. BUFFER (IC23: SN74HC240NS) Input Signal

Port No.	I	SIGNAL NAME
D0	I	RIBBON CASSETTE SW0
D1	I	RIBBON CASSETTE SW1
D2	I	RIBBON CASSETTE SW2
D3	I	RIBBON CASSETTE SW3
D4	I	MANUAL SWITCH S3
D5	I	MANUAL SWITCH S4
D6	I	SIGNNAL DETECT
D7	I	REMOTE2 MEN IN

Table. 5-6

5-2-9. Non-Volatile Memory (IC9 and IC10: CXK1005P)

IC9 is used for setting memory and IC10 is used for caption memory.



IC1
uPD78310A
P01
P03
P17
P16
P02
P04
P05
P06
P07
60
62
10
9
61
63
64
1
2
TP16
TP17
TP18
5V
IC9
CXK1005P
R82
10k
R83
150k
C19
0.47
50V
IN1
TEST1
TEST2
Vcc
OSC
CLK
CE
BUSY
Vss
I/01
I/02
I/03
I/04
5V
IC10
CXK1005P
R84
10k
R85
150k
C20
0.47
50V

Fig. 5-4

1) DR: DATA READ

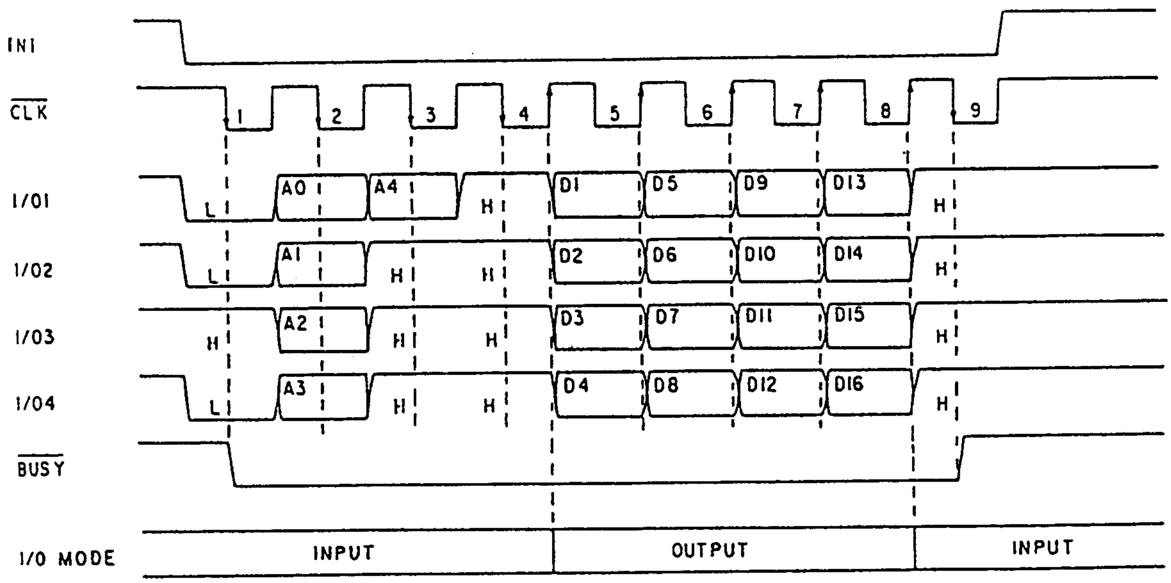

INI
CLK
1
2
3
4
5
6
7
8
9
I/O1
I/O2
I/O3
I/O4
BUSY
I/O MODE
A0
A4
A1
A2
A3
D1
D5
D9
D13
D2
D6
D10
D14
D3
D7
D11
D15
D4
D8
D12
D16
L
H
INPUT
OUTPUT
INPUT

Fig. 5-5

2) DW: DATA WRITE

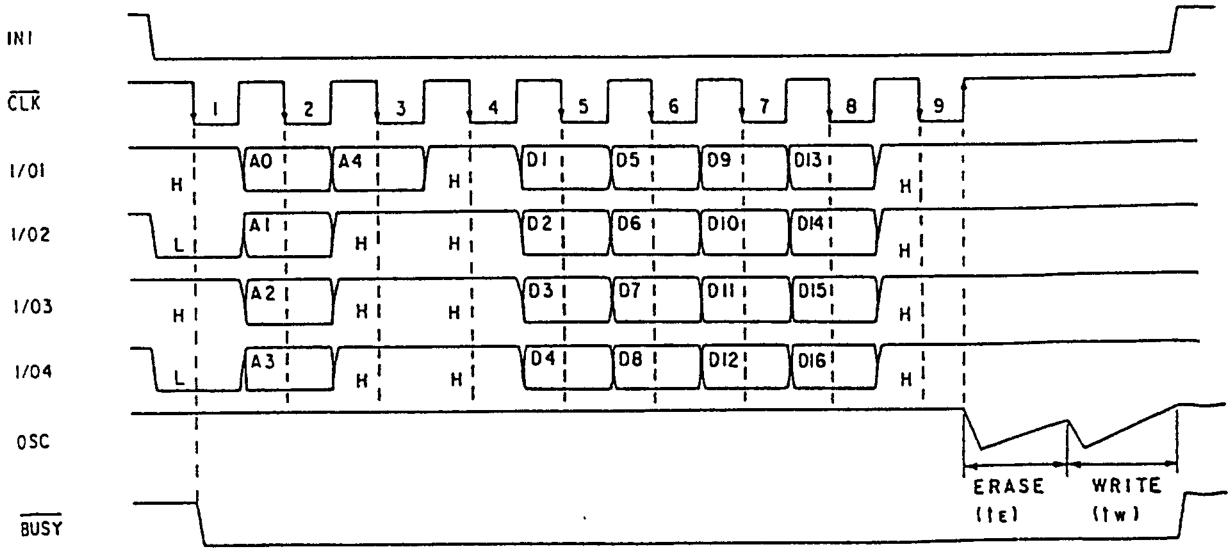

INI
CLK
1
2
3
4
5
6
7
8
9
I/O1
I/O2
I/O3
I/O4
OSC
BUSY
A0
A4
A1
A2
A3
D1
D5
D9
D13
D2
D6
D10
D14
D3
D7
D11
D15
D4
D8
D12
D16
L
H
ERASE
(tE)
WRITE
(tw)

Fig. 5-6

5-3. System Control

For system control there is control of individual Board, RS232C interface and REMOTE 2 interface.

5-3-1. Interface with the KY-12 Board

Carries out dual-direction communications between the SY-9 Board and the KY-12 Board. If the keys on the main unit or the infrared (wired) remote control are pressed, IC2 of the KY-12 Board judges that and sends the signal to IC1 of the SY-9 Board. After processing at IC1, there is transmission of the display (display section, liquid crystal) command from IC1 of the SY-9 Board to IC2 of the KY-12 Board.
Use is made of the serial communications board of the CPU (IC1: uP78310A).

1) Communications Format..............Serial, non-synchronous communications
2) Bit Format.......................................Start Bit 1, Data 8 bit, Stop Bit 1, No Parity
3) Baud Rate...4800 bps

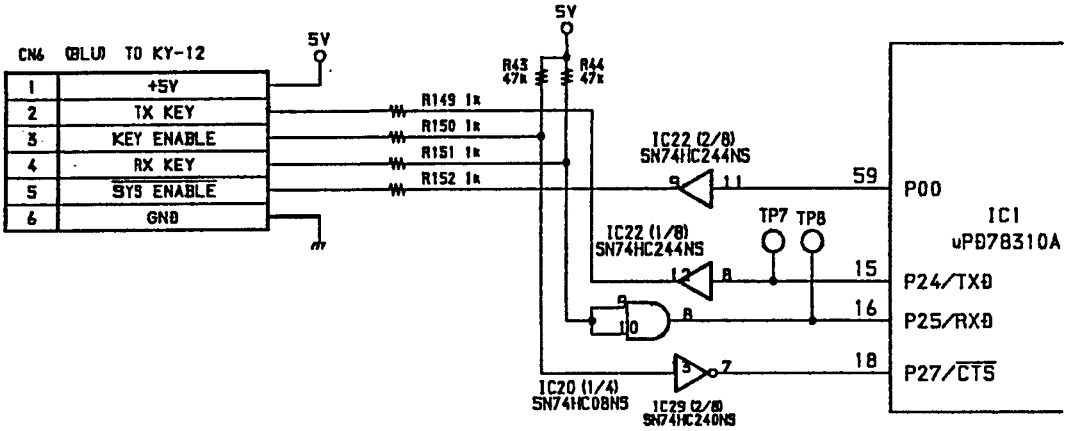

CN6 (BLU) TO KY-12
1 +5V
2 TX KEY
3 KEY ENABLE
4 RX KEY
5 SYS ENABLE
6 GND
5V
5V
R43 47k
R44 47k
R149 1k
R150 1k
R151 1k
R152 1k
IC22 (2/8) SN74HC244NS
9
11
59
P00
IC1 uPD78310A
TP7
TP8
IC22 (1/8) SN74HC244NS
12
8
15
P24/TXD
9
10
8
16
P25/RXD
3
7
18
P27/CTS
IC20 (1/4) SN74HC08NS
IC29 (2/8) SN74HC240NS

Fig. 5-7

For SYS ENABLE, The SY-9 board inhibits and enables communications from the KY-12 Board.

"L".........Enables communications from the KY-12 Board.
"H"........Inhibits communications from the KY-12 Board.

For KEY ENABLE, the KY-12 Board inhibits and enables communications from the SY-9 Board.

"H"........Enables communications from the SY-9 Board.
"L".........Inhibits communications from the SY-9 Board.

5-3-2. Interface with the FMY-8 Board

Basically speaking, this is one-way communications from the SY-9 Board to the FMY-8 Board for sending of memory-in and other commands.
The channel from the FMY-8 Board to the SY-9 Board is for expansion.
Uses CH2 of SIO (IC3: MB89371APF).

1) Communication ....Format Serial, non-synchronous communications
2) Bit Format.............................Start Bit 1, Data 8 bit, Stop Bit 1, No Parity
3) Baud Rate..............................4800 bps

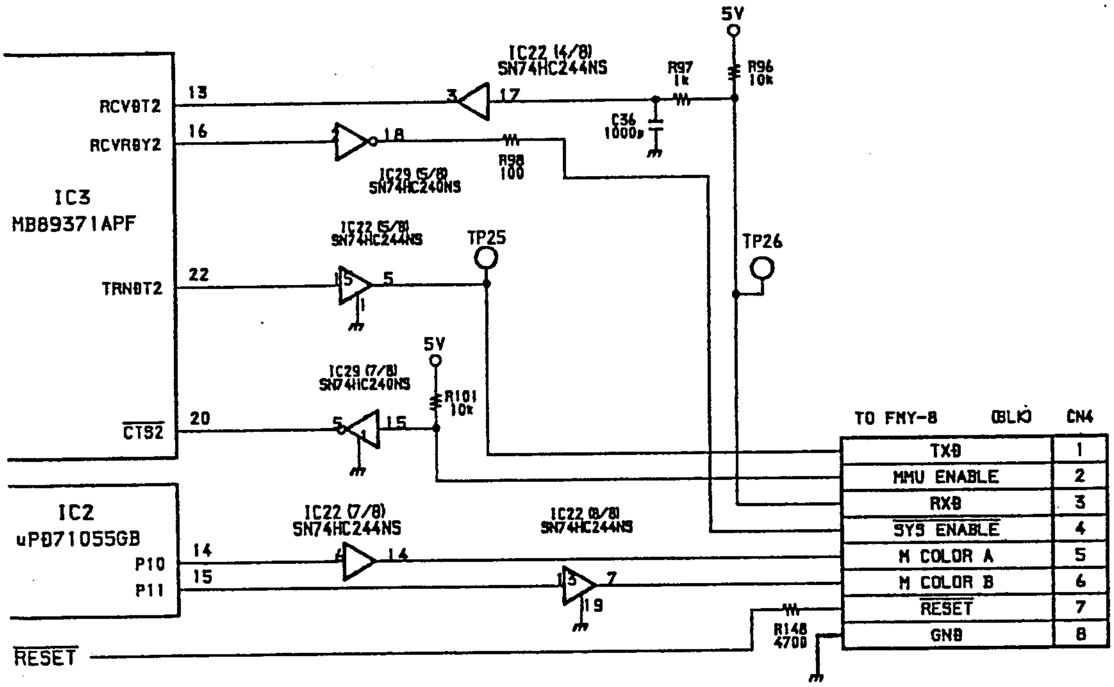

5V
IC22 (4/8)
SN74HC244NS
R97
1k
R96
10k
RCV8T2
13
3
17
C36
1000p
RCVR8Y2
16
18
R98
100
IC29 (5/8)
SN74HC240NS
IC3
MB89371APF
IC22 (5/8)
SN74HC244NS
TP25
TP26
TRN8T2
22
15
5
1
5V
IC29 (7/8)
SN74HC240NS
R101
10k
$\overline{\text{CTS2}}$
20
5
15
1
TO FMY-8
(BLK)
CN4
TXD 1
MMU ENABLE 2
RXD 3
$\overline{\text{SYS ENABLE}}$ 4
M COLOR A 5
M COLOR B 6
$\overline{\text{RESET}}$ 7
GND 8
IC2
uPD71055GB
P10
P11
14
15
IC22 (7/8)
SN74HC244NS
6
14
IC22 (8/8)
SN74HC244NS
13
7
19
R148
4700
$\overline{\text{RESET}}$

Fig. 5-8

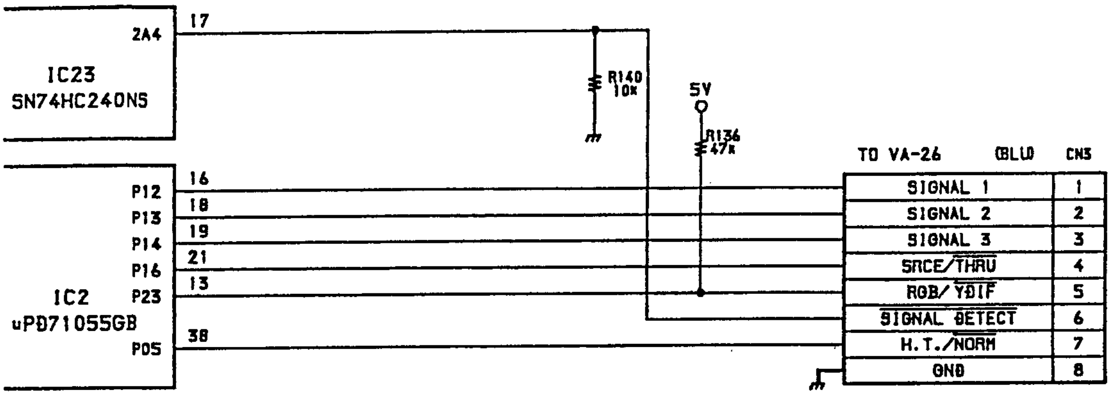
For MMU ENABLE, the FMY-8 Board inhibits and enables communications from the SY-9 Board.

"H"............Enables communications from the SY-9 Board.
"L"............Inhibits communications from the SY-9 Board.

M, COLOR, A, B is a control line. There is supply of information on the color being printed to the masking circuit of the FMY-8 Board.

5-3-3. Interface with the VA-26 Board

These are control signals supplied to the VA-26 Board mainly by means of status.



IC23
SN74HC240NS
2A4
17
R140
10K
5V
R136
47K
IC2
uPD71055GB
P12
P13
P14
P16
P23
P05
16
18
19
21
13
38
TO VA-26 (BLU)
CN3
SIGNAL 1
SIGNAL 2
SIGNAL 3
SRCE/THRU
RGB/YDIF
SIGNAL DETECT
H.T./NORM
GND
1
2
3
4
5
6
7
8

Fig. 5-9

SIGNAL NAME	I/O	MEANING OF SIGNAL
SIGNAL 1 SIGNAL 2 SIGNAL 3	O	Supplies VIDEO , S-VIDEO, RGB(Y-DIF) input conversion information to the VA-26 board. However, Signal 3 is for system expansion.
SRCE/THRU	O	Switches input screen between E to E and THRU.
RGB/YDIF	I	Switches on back of main unit for changing between RGB and Y-DIF.
SIGNAL DETECT	I	Presence or absence of input signal. No INPUT ="H"
H. T/NORM	O	Changes to halftone when displaying menu.

Table. 5-7

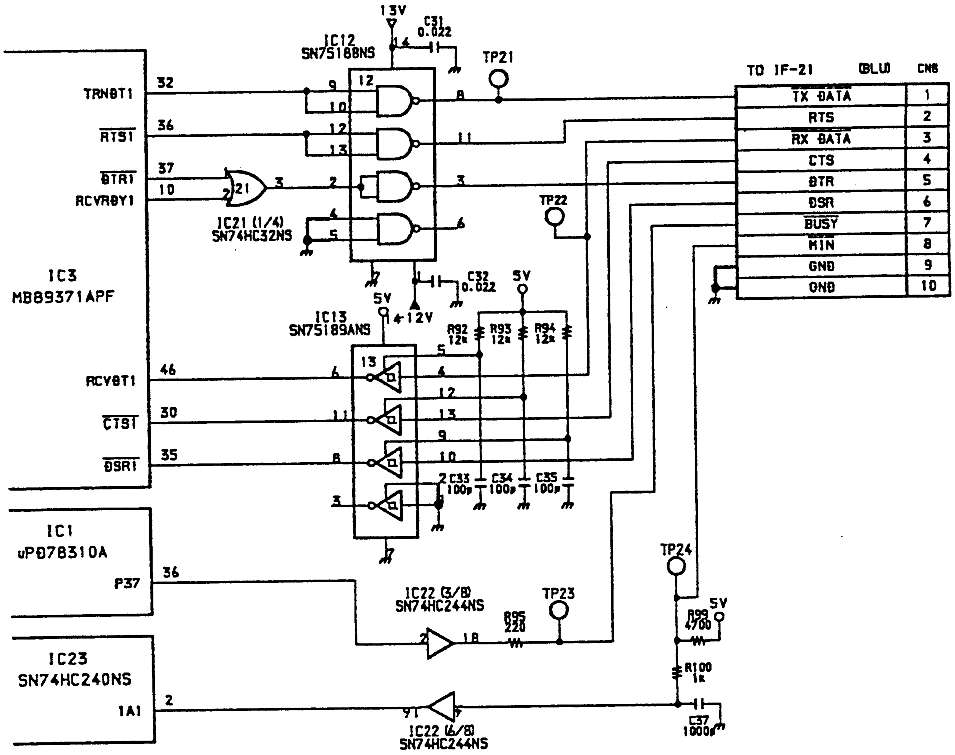
5-3-4. RS232C Interface

After voltage transformation with an RS driver (IC12: SN75188NS and IC13: SN75189ANS), there is use of CH1 of SIO (IC3: MB89371APF).
Includes a special oscillation circuit so that the Baud Rate can be changed.

1) Communications ....Format: Serial, non-synchronous communications
2) Bit Format....................Start Bit 1, Data 8 bit, Stop Bit 1, No Parity
3) Baud Rate.....................1200, 2400, 4800, 9600 bps

5-3-5. REMOTE2 (simple remote control) interface

The $\overline{\text{M IN}}$ singnals are received from the simple remote control and processed and the $\overline{\text{BUSY}}$ singnal is output.



13V
C31
0.022
IC12
SN75188NS
TP21
TO IF-21
(BLU)
CN8
TX DATA
RTS
RX DATA
CTS
DTR
DSR
BUSY
MIN
GND
GND
1
2
3
4
5
6
7
8
9
10
TRNDT1
RTS1
DTR1
RCVRDY1
32
36
37
10
IC21 (1/4)
SN74HC32NS
TP22
IC3
MB89371APF
C32
0.022
5V
+12V
IC13
SN75189ANS
R92
12k
R93
12k
R94
12k
RCVDT1
CTS1
DSR1
46
30
35
C33
100p
C34
100p
C35
100p
IC1
uPD78310A
P37
36
TP24
IC22 (3/8)
SN74HC244NS
TP23
R95
220
R99
4700
R100
1k
IC23
SN74HC240NS
1A1
2
IC22 (6/8)
SN74HC244NS
C37
1000p

Fig. 5-10

5-4. Mechanism control

Print mechanism operations are controlled with motors and sensors.

5-4-1. Head up/down motor drive circuit

The head is raised and lowered by using the drive IC (IC19: M54543L) to drive a DC motor.

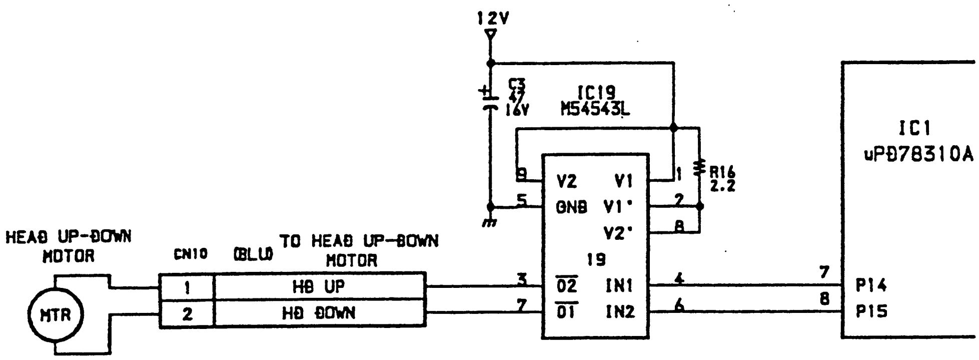

12V
C3
47
16V
IC19
M54543L
IC1
uPD78310A
9
V2
V1
1
R16
2.2
5
GND
V1'
2
V2'
8
19
HEAD UP-DOWN
MOTOR
CN10
(BLU)
TO HEAD UP-DOWN
MOTOR
1
HD UP
3
$\overline{02}$
IN1
4
7
P14
MTR
2
HD DOWN
7
$\overline{01}$
IN2
6
8
P15

Fig. 5-11

INPUT		OUTPUT		OPERATION OF HEAD U/D MOTOR
IN1	IN2	01	02	
L	L	"OFF"	"OFF"	Non-Operation of IC
H	L	H	L	Forward rotation (Head Up)
L	H	L	H	Backward rotation (Head Down)
H	H	L	L	Brake

Table. 5-8 Operation of driver IC (IC19 : M54543L)

5-4-2. Stepping motor drive circuit

The platen and paper feed roller are driven by a stepping motor.
The drive is 2-phase excitation using the CPU (IC1: μPD78310A) software.

- Print time : 358 pps
- Rewind and paper eject time : 2608 pps at maximum speed (high-speed mode)
- Paper feed time : 1067 pps at maximum speed (high-speed mode)

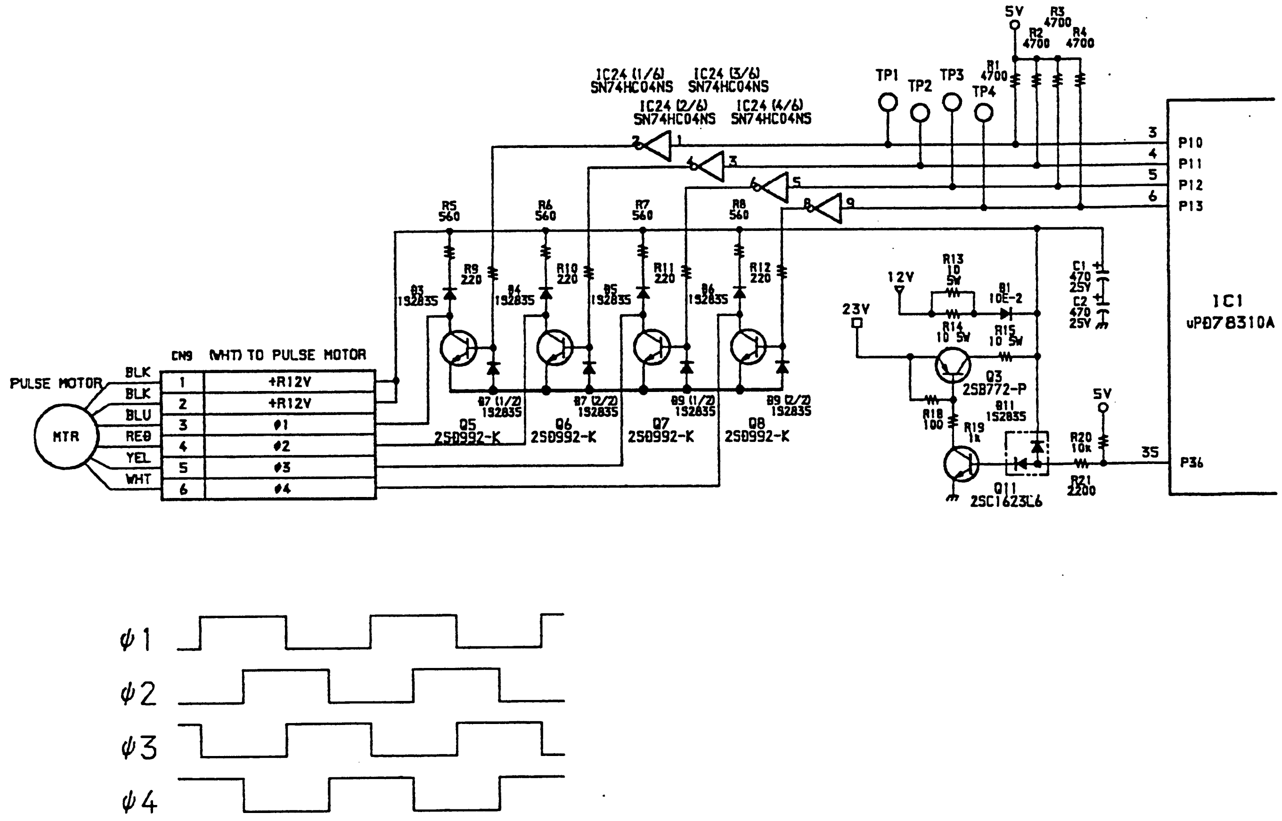

5V
R3 4700
R2 4700
R4 4700
R1 4700
IC24 (1/6) SN74HC04NS
IC24 (3/6) SN74HC04NS
IC24 (2/6) SN74HC04NS
IC24 (4/6) SN74HC04NS
TP1
TP2
TP3
TP4
2
1
4
3
6
5
8
9
3
4
5
6
P10
P11
P12
P13
R5 560
R6 560
R7 560
R8 560
R9 220
R10 220
R11 220
R12 220
D3 1S2835
D4 1S2835
D5 1S2835
D6 1S2835
D7 (1/2) 1S2835
D7 (2/2) 1S2835
D9 (1/2) 1S2835
D9 (2/2) 1S2835
Q5 2SD992-K
Q6 2SD992-K
Q7 2SD992-K
Q8 2SD992-K
CN9 (WHT) TO PULSE MOTOR
PULSE MOTOR
MTR
BLK
BLK
BLU
RED
YEL
WHT
1 +R12V
2 +R12V
3 φ1
4 φ2
5 φ3
6 φ4
12V
R13 10 5W
D1 10E-2
R14 10 5W
R15 10 5W
23V
Q3 2SB772-P
D11 1S2835
R18 100
R19 1k
Q11 2SC1623L6
C1 470 25V
C2 470 25V
5V
R20 10k
R21 2200
35
P36
IC1
uPD78310A
φ1
φ2
φ3
φ4

Fig. 5-12

High-speed mode swithched the stepping motor drive voltage from +12 V to +24 V.

5-4-3. Ribbon motor drive circuit

The ribbon take up is driven by a DC motor. To raise the precision of the ribbon position, a brake circuit is used to improve the ribbon motor stopping. The ribbon feed speed is different for printing and paper positioning. This speed adjustment is determined by the PWM output set by the CPU (IC1: μPD78310A) software.

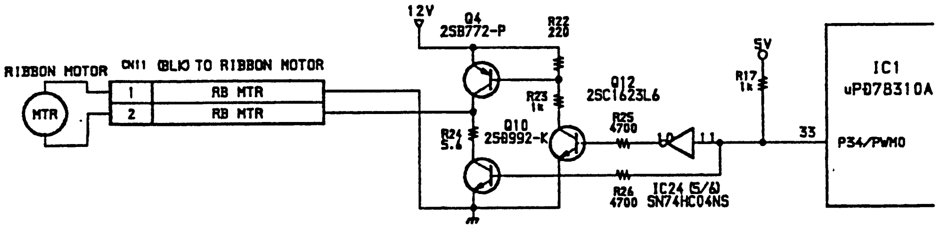

RIBBON MOTOR
MTR
CN11 (BLK) TO RIBBON MOTOR
1
RB MTR
2
RB MTR
12V
Q4
2SB772-P
R22
220
R23
1k
R24
5.6
Q10
2SB992-K
Q12
2SC1623L6
R25
4700
R26
4700
10
11
IC24 (5/6)
SN74HC04NS
5V
R17
1k
33
IC1
uPD78310A
P34/PWM0

Fig. 5-13 Ribbon motor drive circuit

5-4-4. Sensor and Switch Input

CHART	SENSOR NAME	DETECTION METHOD OR OPERATION	DETECTUON LEVEL		SENSOR CIRCUIT OUTPUT	CONNECTOR No. & TP No.
5-14	P CHECK 1 P CHECK 2	Detects the type of paper and whether there is paper by combined use of two sensors (reflector type sensors).	No paper	H H	←	CN15 TP9. TP10
			Normal paper	H L	←	
			OHP paper	L H	←	
			Reverse side	L L	←	
5-15	TRAY SENSE	Microswitch is ON when feeding tray is inserted.	Tray	L	←	CN16 TP11
			No tray	H	←	
5-16	E JAM PHTR	Judges that there is paper when the light is blocked.	Paper	H	←	CN18 TP12
			No paper	L	←	
5-17	P EDGE PHTR	Judges that there is paper when the light is blocked.	Paper	H	←	CN20 TP13
			No paper	L	←	
5-18	HD POSI PHTR	Judges that the paper has come to position when the light passes.	Position	L	←	CN21 TP14
			Not position	H	←	
5-19	HD HOME POSI PHTR	Judges that the paper has come to home position when the light passes.	Home position	L	←	CN22 TP15
			Not home position	H	←	
5-20	RIBBON CODE PHTR	Judges that the bar code has come when the light is blocked.	Bar code	H	←	CN41 TP6
			No bar code	L	←	
5-21	RIBBON ROT PHTR	There is rotation when the light reflected off a rotating disc with 24 equidistant reflecting surfaces changes.	Rotation		←	CN13 TP5
			No rotation	H or L	←	
5-22	CASETTE SW 0 CASETTE SW 1 CASETTE SW 2 CASETTE SW 3	Depending on how these four switches are pressed, it is possible to judge the type of ribbon in the ribbon cassette and whether there is a ribbon or not.	B & W	L H H H	H L L L	CN7
			OHP	H L H H	L H L L	
			COLOR	H H H H	L L L L	
			L-COLOR	H H H L	L L L H	
			No cassette	L L L L	H H H H	
	S1	When this switch is pressed, the NMI operates and the unit goes to manual mode.	NMI operates on the rise edge.	↓	↓	(Switch in the substrate) S1
	S3	The ribbon motor continues to rotate while the switch is depressed and stops when the switch is released.	Rotating	H	L	(Switch in the substrate) S3
			Stopped	L	H	
	S4	The stepping motor continues to rotate while the switch is depressed and stops when the switch is released.	Rotating	H	L	(Switch in the substrate) S4
			Stopped	L	H	
	S3. S4 (pressed simultaneously)	When the switches are depressed, move to the next head position among the four possible head positions.	Goes to next head position and stops.	H H	L L	(Switch in the substrate) S3. S4
			Stops	L L	H H	

Table. 5-9

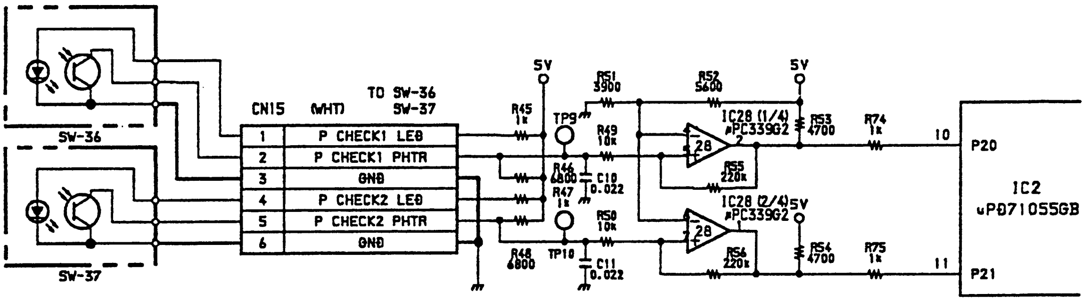

SW-36
SW-37
CN15
(WHT)
TO SW-36
SW-37
1
P CHECK1 LED
2
P CHECK1 PHTR
3
GND
4
P CHECK2 LED
5
P CHECK2 PHTR
6
GND
5V
R45
1k
TP9
R46
6800
R47
1k
R48
6800
TP10
R49
10k
R50
10k
C10
0.022
C11
0.022
R51
3900
R52
5600
IC28 (1/4)
μPC339G2
IC28 (2/4)
μPC339G2
28
R53
4700
R54
4700
R55
220k
R56
220k
R74
1k
R75
1k
10
11
P20
P21
IC2
uPD71055GB

Fig. 5-14

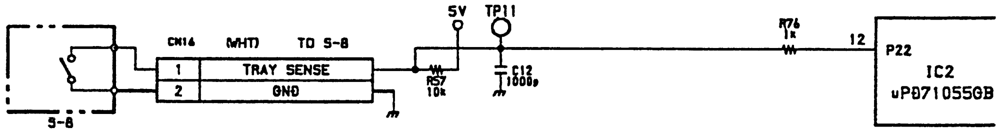

S-8
CN14
(WHT)
TO S-8
1
TRAY SENSE
2
GND
5V
TP11
R57
10k
C12
1000p
R76
1k
12
P22
IC2
uPD71055GB

Fig. 5-15

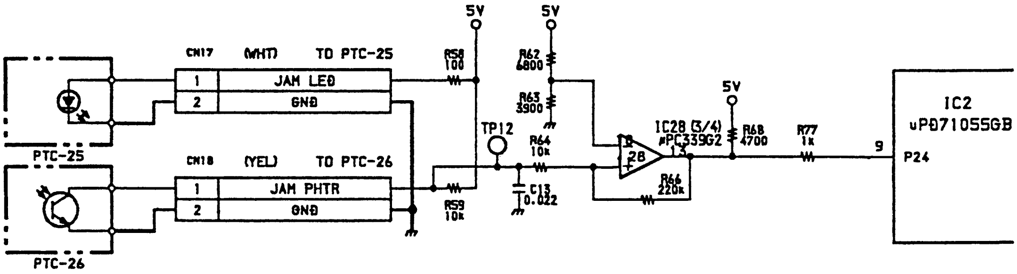

PTC-25
PTC-26
CN17
(WHT)
TO PTC-25
1
JAM LED
2
GND
CN18
(YEL)
TO PTC-26
1
JAM PHTR
2
GND
5V
R58
100
R59
10k
R62
6800
R63
3900
TP12
R64
10k
C13
0.022
IC28 (3/4)
μPC339G2
28
10
13
R68
4700
R66
220k
R77
1k
9
P24
IC2
uPD71055GB

Fig. 5-16

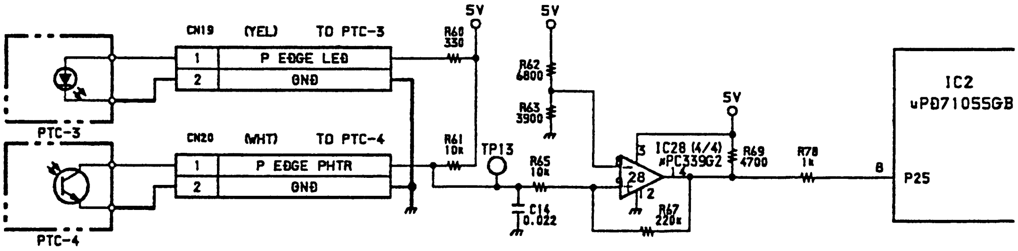

PTC-3
PTC-4
CN19
(YEL)
TO PTC-3
1
P EDGE LED
2
GND
CN20
(WHT)
TO PTC-4
1
P EDGE PHTR
2
GND
5V
R60
330
R61
10k
R62
6800
R63
3900
TP13
R65
10k
C14
0.022
IC28 (4/4)
μPC339G2
28
3
12
14
R69
4700
R67
220k
R78
1k
8
P25
IC2
uPD71055GB

Fig. 5-17

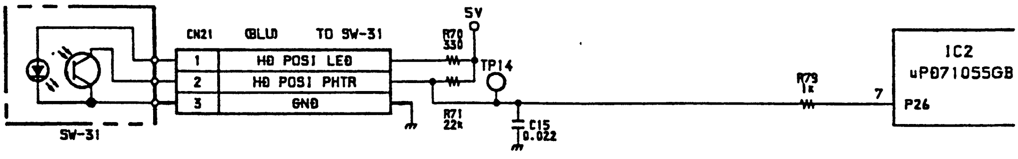

SW-31
CN21
(BLU)
TO SW-31
1
HD POSI LED
2
HD POSI PHTR
3
GND
5V
R70
330
TP14
R71
22k
C15
0.022
R79
1k
7
P26
IC2
uPD71055GB

Fig. 5-18

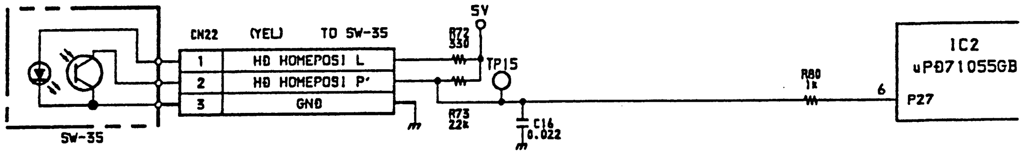

SW-35
CN22
(YEL)
TO SW-35
1
HD HOMEPOSI L
2
HD HOMEPOSI P'
3
GND
5V
R72
330
R73
22k
TP15
C16
0.022
R80
1k
6
IC2
uPD71055GB
P27

Fig. 5-19

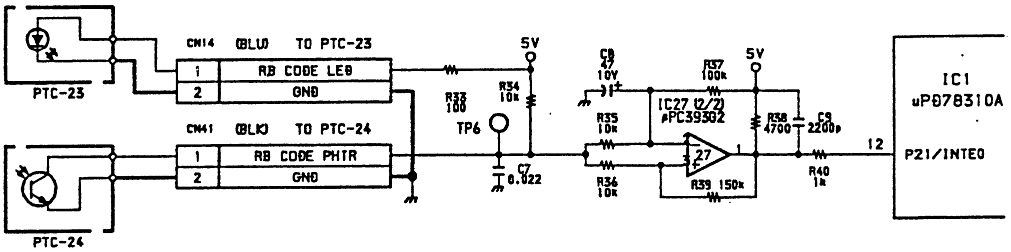

PTC-23
PTC-24
CN14
(BLU)
TO PTC-23
1
RB CODE LED
2
GND
CN41
(BLK)
TO PTC-24
1
RB CODE PHTR
2
GND
5V
R33
100
R34
10k
TP6
C7
0.022
C8
47
10V
R35
10k
R36
10k
IC27 (2/2)
μPC393G2
27
R37
100k
5V
R38
4700
C9
2200p
R39 150k
R40
1k
12
IC1
uPD78310A
P21/INTE0

Fig. 5-20

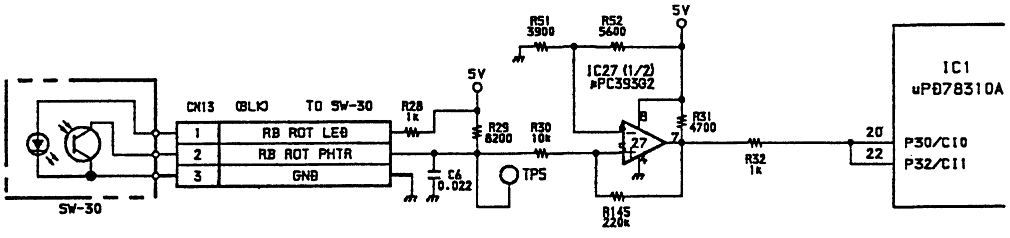

SW-30
CN13
(BLK)
TO SW-30
1
RB ROT LED
2
RB ROT PHTR
3
GND
R28
1k
5V
R29
8200
C6
0.022
TP5
R30
10k
R51
3900
R52
5600
5V
IC27 (1/2)
μPC393G2
8
27
7
4
R31
4700
R145
220k
R32
1k
20
22
IC1
uPD78310A
P30/CI0
P32/CI1

Fig. 5-21

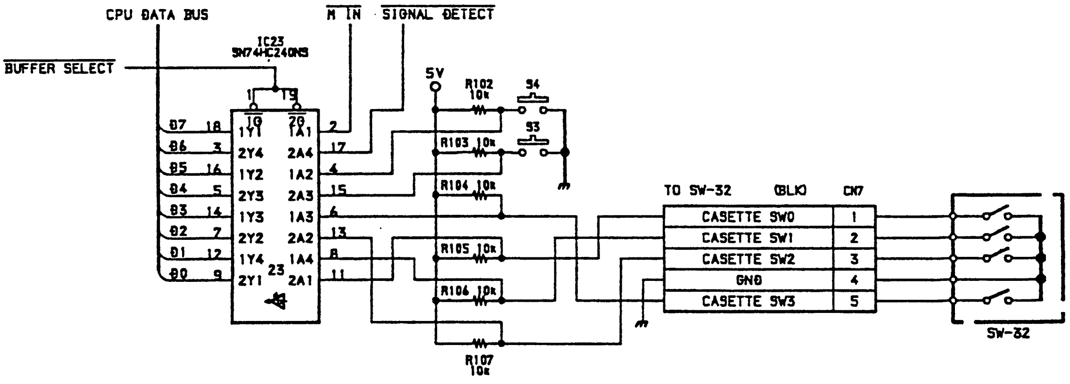

CPU DATA BUS
BUFFER SELECT
IC23
SN74HC240NS
M IN
SIGNAL DETECT
1
19
1G
2G
D7
18
1Y1
D6
3
2Y4
D5
16
1Y2
D4
5
2Y3
D3
14
1Y3
D2
7
2Y2
D1
12
1Y4
D0
9
2Y1
23
1A1
2
2A4
17
1A2
4
2A3
15
1A3
6
2A2
13
1A4
8
2A1
11
5V
R102
10k
S4
R103 10k
S3
R104 10k
R105 10k
R106 10k
R107
10k
TO SW-32
(BLK)
CN7
CASETTE SW0
1
CASETTE SW1
2
CASETTE SW2
3
GND
4
CASETTE SW3
5
SW-32

Fig. 5-22

5-5. Head control

The head control section is a circuit that applies various correction and other processing to the print data sent from the FMY-8 board and sends the resulting data to the thermal head to be printed.

5-5-1. γ Compensation circuit

The print data sent from the FMY-8 board is γcompensated with the data conversion table in the γROM (IC5: HN27C101AP).

2 bits for color switching, 2 bits for ribbon type, 4 bits for the thermal head temperature compensation, and 1 bit for laminating and preheating are allocated in the γROM address. Different γ data is selected according to the signals from the CPU (IC1: μPD78310A).

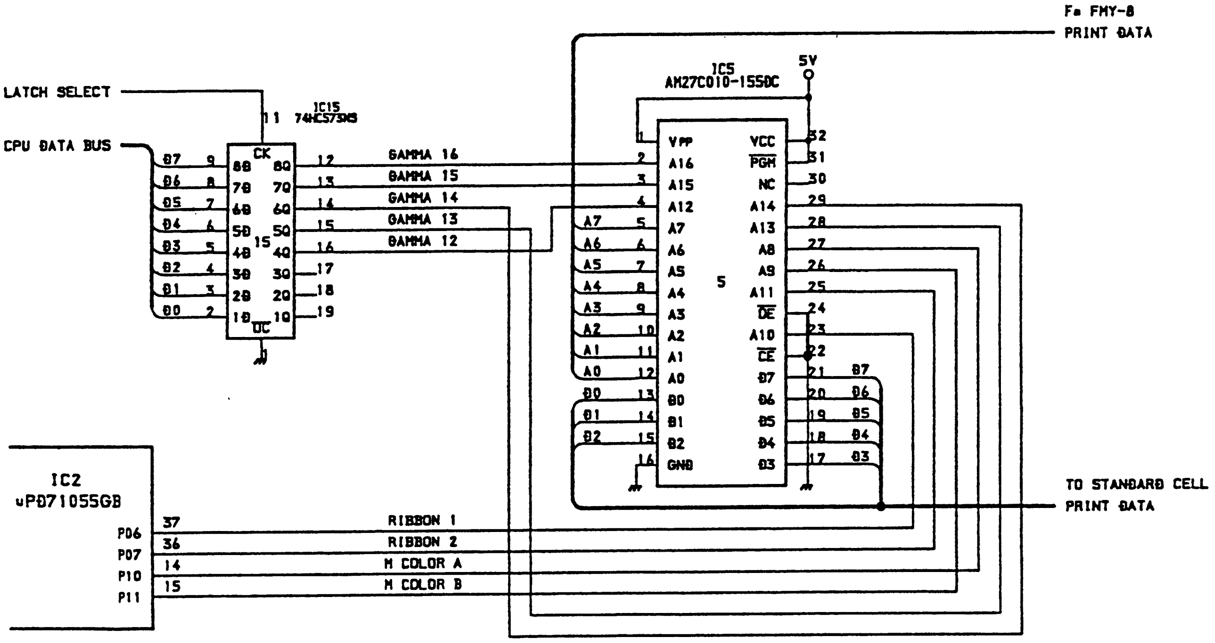

LATCH SELECT
CPU DATA BUS
IC15
74HC573GB
CK
OC
D7
D6
D5
D4
D3
D2
D1
D0
GAMMA 16
GAMMA 15
GAMMA 14
GAMMA 13
GAMMA 12
IC5
AM27C010-155DC
5V
VPP
A16
A15
A12
A7
A6
A5
A4
A3
A2
A1
A0
D0
D1
D2
GND
VCC
PGM
NC
A14
A13
A8
A9
A11
OE
A10
CE
D7
D6
D5
D4
D3
Fm FMY-8
PRINT DATA
TO STANDARD CELL
PRINT DATA
IC2
uPD71055GB
P06
P07
P10
P11
RIBBON 1
RIBBON 2
M COLOR A
M COLOR B

Fig. 5-23

5-5-2. Standared cell

The head control standard cell (IC11: HDC443V2) applies the next signal processing to the γ compensated print data, finally the data is pulse width modulated and sent to the thermal head.

1) Interpolation processing

During field printing, improve quality, other fields are interpolated wiath an interpolation techniqure that uses pattern recognition.

2) Edge emphasis processing

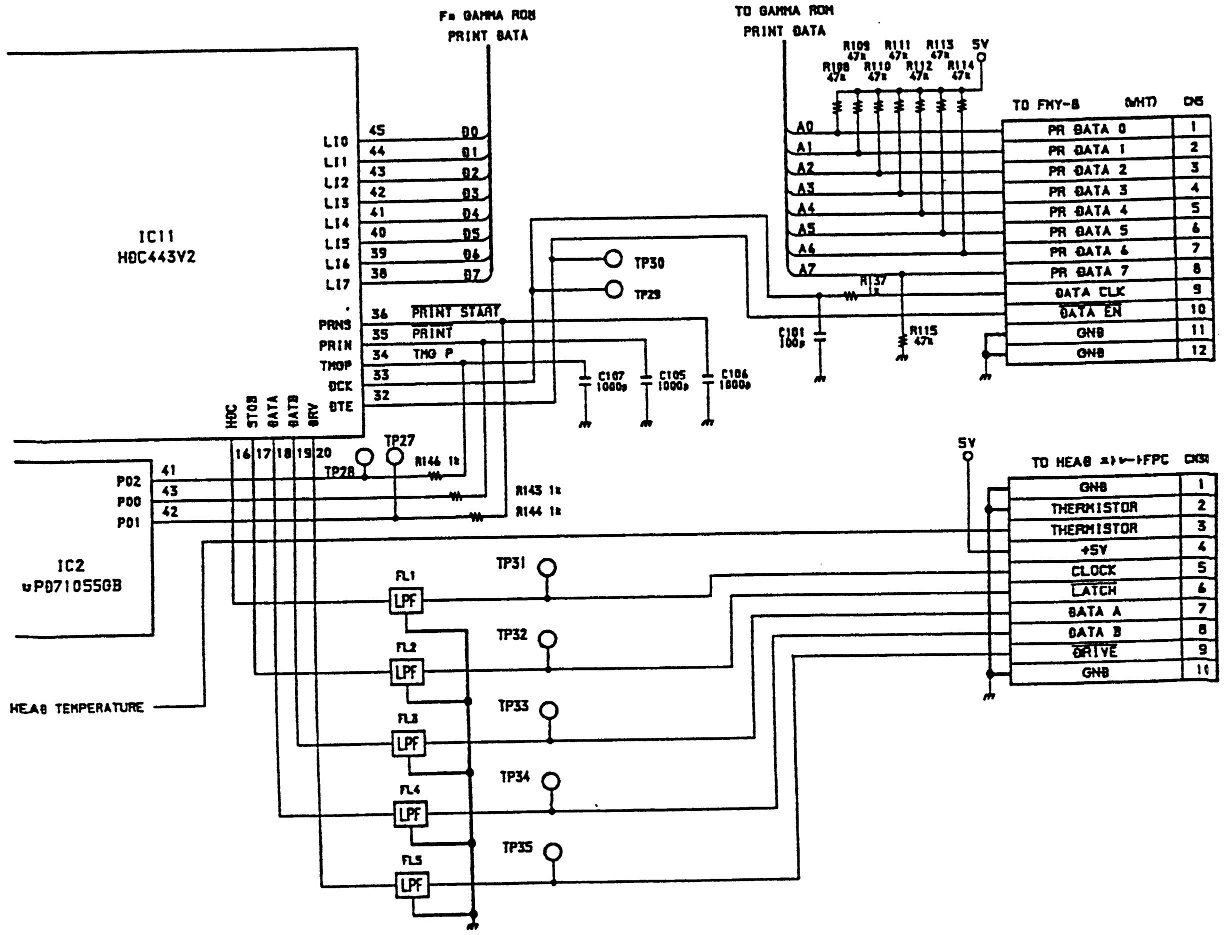
Horizontal and vertical FIR digital filters emphasize the edges to raise the image clarity.

3) Rising correction

A horizontal IIR digital filter is used to correct the dulling of the rise caused by poor head thermal response.

4) Line count correction

The head element voltage is corrected by controlling the conductance duration.



Fm GAMMA ROM
PRINT DATA
TO GAMMA ROM
PRINT DATA
IC11
HDC443V2
LI0
LI1
LI2
LI3
LI4
LI5
LI6
LI7
45
44
43
42
41
40
39
38
D0
D1
D2
D3
D4
D5
D6
D7
PRNS
PRIN
TMOP
DCK
DTE
36
35
34
33
32
PRINT START
PRINT
TMG P
HDC
STOB
DATA
DATB
DRV
16
17
18
19
20
TP30
TP29
TP27
TP28
R146 1k
R143 1k
R144 1k
C107 1000p
C105 1000p
C106 1000p
R109 47k
R111 47k
R113 47k
5V
R108 47k
R110 47k
R112 47k
R114 47k
A0
A1
A2
A3
A4
A5
A6
A7
R137
C101 100p
R115 47k
TO FMY-8 (WHT) CN5
PR DATA 0 1
PR DATA 1 2
PR DATA 2 3
PR DATA 3 4
PR DATA 4 5
PR DATA 5 6
PR DATA 6 7
PR DATA 7 8
DATA CLK 9
DATA EN 10
GND 11
GND 12
IC2
uPD71055GB
P02
P00
P01
41
43
42
HEAD TEMPERATURE
FL1
FL2
FL3
FL4
FL5
LPF
TP31
TP32
TP33
TP34
TP35
5V
TO HEAD ヘッドFPC CN31
GND 1
THERMISTOR 2
THERMISTOR 3
+5V 4
CLOCK 5
LATCH 6
DATA A 7
DATA B 8
DRIVE 9
GND 10

Fig. 5-24

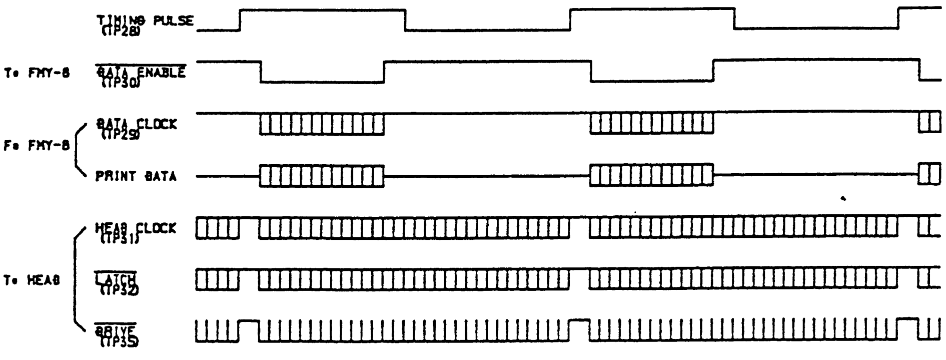

TIMING PULSE (TP28)
To FMY-8
DATA ENABLE (TP30)
Fo FMY-8
DATA CLOCK (TP29)
PRINT DATA
To HEAD
HEAD CLOCK (TP31)
LATCH (TP32)
DRIVE (TP35)

Fig. 5-25 Standard Cell Input/Output Timing

When the CPU sets $\overline{\text{PRINT}}$ and $\overline{\text{PRINT START}}$ "Low", the standard cell can print and the printing of one line start's at the rising edge the timing pulse. At the rising edge of the timing pulse, the standard cell sets $\overline{\text{DATA ENABLE}}$ "Low" and the data clock and the print data synchronized to it are sent from the FMY-8 board. First, the print data is stored into external SRAM (IC7: CXK5814P), then external SRAM (IC8: CXK5814P) and four internal SRAMs are used for arithmetic processeing. The resulting print data is pulse width modulated sychronized with the rising edge of two timing pulses later and the serial print data, shift clock, latch, and drive signals are sent to the thermal head.

5-5-3. V CONT Circuit

For temperature correction there is change in the V CONT voltage to change the power source voltage of the head.
The thermistor (TH1) on the Board and the thermistor on the thermal head are used to detect the temperature inside the unit and the temperature on the head and to output the V CONT voltage via the operation amp circuit. The head power source is used to drive the stepping motor. Because high voltage is required during the high speed mode, Q1 and Q2 are used to change the V CONT voltage.

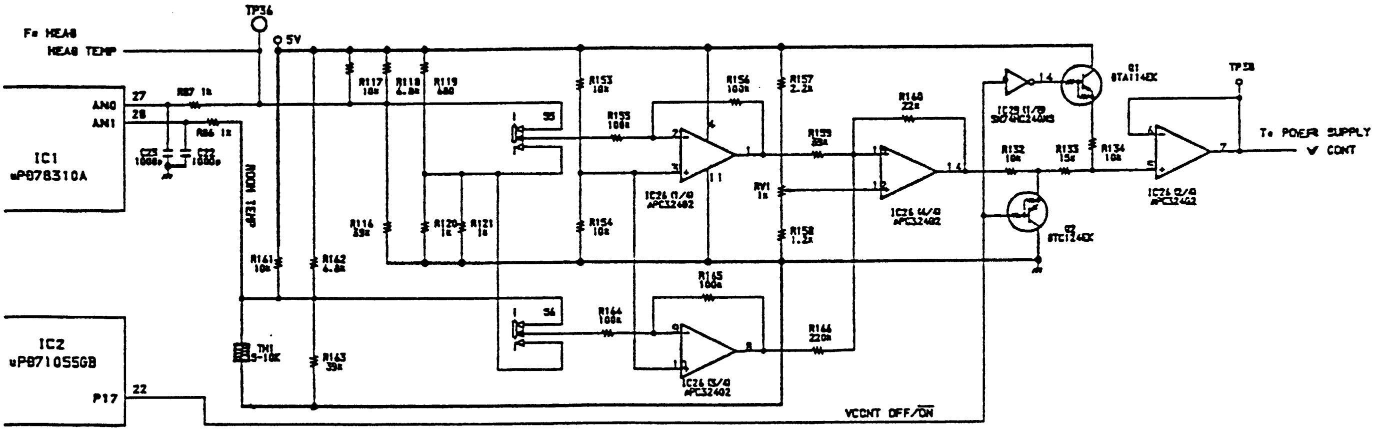

TP36
Fo HEAD
HEAD TEMP
5V
IC1
uPD78310A
AN0
AN1
27
28
R87 1k
R86 1k
C23 1000p
C22 1000p
ROOM TEMP
R117 10k
R118 6.8k
R119 680
R116 39k
R120 1k
R121 1k
R161 10k
R162 6.8k
R163 39k
TH1 3-10K
IC2
uPD71055GB
P17
22
S5
S6
R153 10k
R155 100k
R154 10k
R156 100k
R157 2.2k
R158 1.2k
RV1 1k
IC26 (1/4) uPC32402
IC26 (3/4) uPC32402
IC26 (4/4) uPC32402
IC26 (2/4) uPC32402
R164 100k
R165 100k
R166 220k
R159 33k
R160 22k
IC29 (1/8) SN74HC240NS
Q1 DTA114EK
Q2 DTC124EK
R132 10k
R133 15k
R134 10k
TP38
To POWER SUPPLY
V CONT
VCONT OFF/ON

Fig. 5-26

Also, the voltage of the two thermistors is input to the A/D conversion port of CPU and this is used to choose between pre-heat function and the temperature compensation γ by means of software.

6. INTERFACE SYSTEM (KY-12 BOARD)

6-1. General

The KY-12 Board mainly has the following functions, receipt of keys from the main unit, alarm (LED), print (LED), liquid crystal and displays and receipt of signals from the remote control. Control signals from system control of the SY-9 Board are received and controlled by the key control circuit (CPU).

The KY-12 Board is composed as shown in the following block diagram with the H8/325 single chip microcomputer acting as the center.

1) Key input interface
2) Remote control input interface
3) System control serial communications interface
4) Control display control serial communications interface
5) LCD control parallel interface

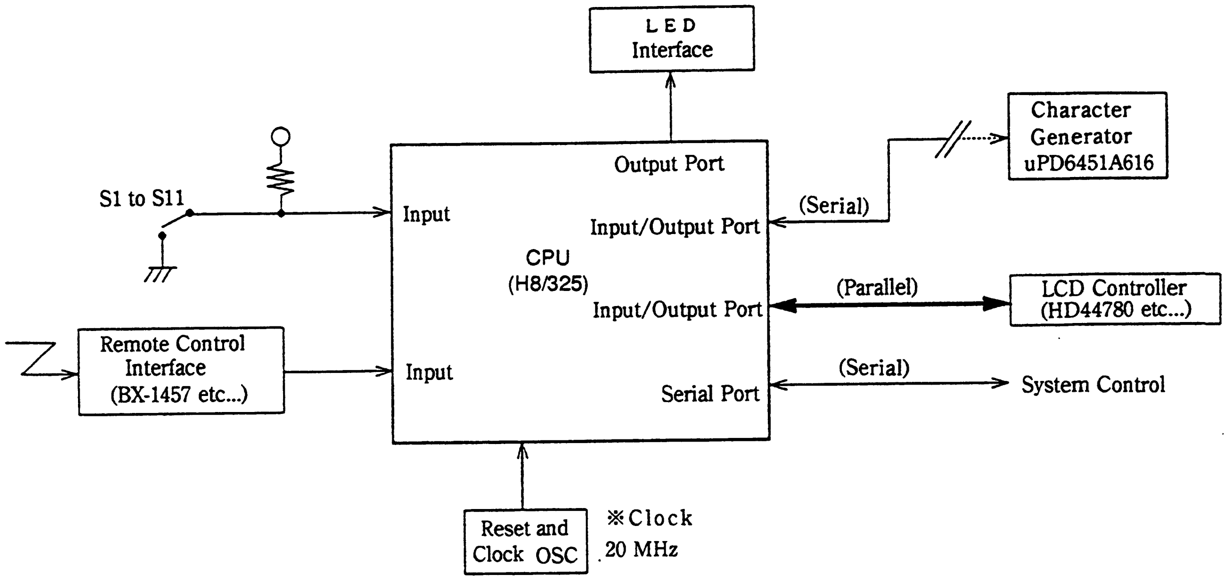

LED Interface
Character Generator uPD6451A616
S1 to S11
Input
Output Port
Input/Output Port
CPU (H8/325)
(Serial)
(Parallel)
Input/Output Port
LCD Controller (HD44780 etc...)
Remote Control Interface (BX-1457 etc...)
Input
Serial Port
(Serial)
System Control
Reset and Clock OSC
※Clock 20 MHz

Fig. 6-1

6-2. KEY Input Interface

The CPU ports corresponding to the keys are constantly pulled up by the power source. When the key is pressed the port level goes to LOW. Key input is composed of the 11 switches S1 to S11. They are divided into the keys that can be operated independently (direct) and keys that are operated while viewing the menu screen (menu-related).

KEY			FUNCTION
DIRECT	S 1	SOURCE/MEMORY	Switching of monitor signal.
	S 2	MEMORY PAGE	Switching of memory page.
	S 9	STOP	Stop of printing.
	S10	PRINT	Start of printing.
	S11	MEMORY IN	Inclusion of input signal in memory.
MENU	S 3	CURSOR [RIGHT]	Moves the cursor to the right..
	S 4	MENU	Summonsing menu screen, returning to former menu.
	S 5	EXECUTE	Execution of operations displayed on menu.
	S 6	CURSOR [LEFT]	Moves the cursor to the left.
	S 7	CURSOR [DOWN]	Moves the cursor down.
	S 8	CURSOR [UP]	Moves the cursor up.

Table. 6-1

In addition, there is double strike of keys for a number of special uses.

KEY		FUNCTION
Pressing two keys simultaneously	S 3 + S 6	Forced standardization of color adjustment value. Moves spilit position to original position.
	S 9 + S 1 1 & power source ON	Moves to test mode (serviceman mode).
	S 1 + S 9	Moves from test mode to communications mode.

Table. 6-2

6-3. Remote Control Input Interface

The interface is so composed that it can respond to wired or wireless commands. By inserting the output plug of the remote control in the 3.5 dia-meter minijack input, an SIRCS signal is input from the Pin 1 of CN5 for response to the wired commander. By removing the output plug from the remote control, the Pin 1 and 2 of CN5 are shorted so that an SIRC signal from IC4 is input and the system responds to the wireless remote control. Regarding IC4, at the light receiving section of the infrared remote control there is integration of a 480 kHz signal intermittently sent from remote control and this is converted into a 16 bit signal.

6-4. System Control Serial Communications Interface

For serial communications between KEY control (KY-12 Board) and system control (SY-9 Board) there is use of a non-synchronous serial communications used by the RS-232C and other devices.

Communications specifications

Communications format..........Non-synchronous serial communications
Communications speed...........4800 bps
Start bit..1 bit
Data..8 bit
Stop bit..1 bit
Parity..No parity
Communications direction.....Bi-directional (by means of a control line)
Communications level.............TTL level

6-5. CRT screen display control serial communications interface

In order to output menu characters and general display characters onto the moniter screen in addition to the video data, the CRT screen character display controller, IC2 (μPD6451AGT-006), is used. The interface format for the μPD6451 is synchronous serial transfer, so the IC2 input/output is used and the four singnals required by the CRT screen character display controller are created.

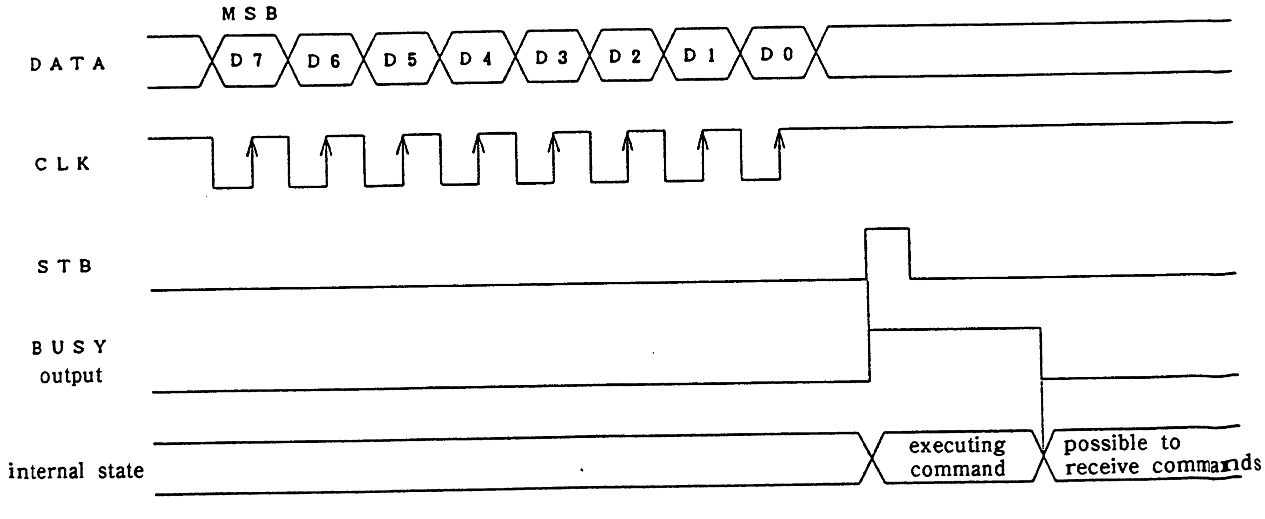


Fig. 6-2

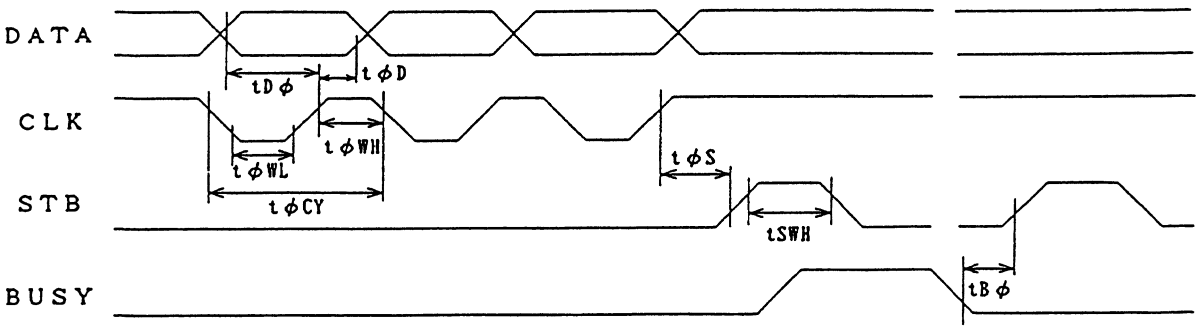

DATA
CLK
STB
BUSY
tDφ
tφD
tφWH
tφWL
tφCY
tφS
tSWH
tBφ

Fig. 6-3

ITEM	ABBREVIATION	MIN	MAX	UNIT
Minimum setup time	$t_{D}\phi$	200	—	nsec
Minimum hold time	$t\phi_{D}$	200	—	nsec
Minimum clock low level width	$t\phi_{WL}$	700	—	nsec
Minimum clock high level width	$t\phi_{WH}$	700	—	nsec
Minimum clock-strobe time	$t\phi_{S}$	400	—	nsec
Minimum strobe high level width	$t\phi_{SWH}$	1	—	μsec
Clock cycle	$t\phi_{CY}$	1.6	—	μsec
Minimum pin-strobe time	$t_{B}\phi$	100	—	μsec

Table. 6-3

6-6. LCD control parallel interface

An LCD module with an HD44780 LCD controller is used to display menu characters and general display characters.
The HD44780 LCD module control driver uses parallel data transfer including control signals and uses the IC2 input/output port for connection with the control driver.

MOVEMENT OF WRITE

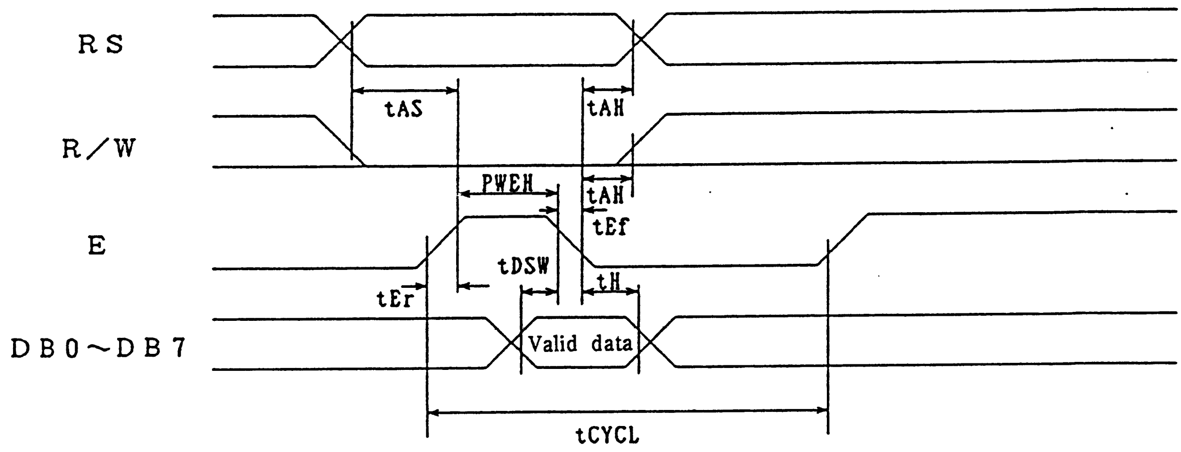


Fig. 6-4

ITEM		ABBREVIATION	MIN	MAX	UNIT
Enable pulse width	"High" level	PW_{EH}	450	–	n sec
Enable cycle time		t_{CYCL}	1000	–	n sec
Enable rise, fall time		$t_{Er} \cdot t_{Ef}$	–	25	n sec
Set up time	RS, R/W-E	t_{AS}	140	–	n sec
Address hold time		t_{AH}	10	–	n sec
Data setup time		t_{DSW}	195	–	n sec
Data hold time		t_{H}	10	–	n sec

Table. 6-4

6-7. CPU (H8/325) port map

TERMINAL	SIGNAL NAME	I/O	FUNCTION
1	XTAL		Connect clock oscillator. 20 MHz
2	EXTAL		
3	MD$_1$	I	Operational mode control terminal.
4	MD$_0$	I	Mode 3 : MD$_0$ = 1, MD$_1$ = 1
5	(NMI)	(I)	
6	Vcc		+5 V
7	(STBY)	(I)	
8	Vss		GND
9			
10			
11			
12			
13			
14	RIGHT KEY	I	Key input signal
15	MEMORY PAGE KEY	I	Key input signal
16	SOURCE/MEMORY KEY	I	Key input signal
17	TXD (CRT)	O	Display section IC data signal
18	STB (CRT)	O	Display section IC strobe signal
19	CLK (CRT)	O	Display section display IC clock signal
20	TXD (SY)	O	Transmission data signal to system control
21	RXD (SY)	I	Receipt data signal from system control
22			
23	MEMORY IN KEY	I	Key input signal
24	PRINT KEY	I	Key input signal
25	STOP KEY	I	Key input signal
26	UP KEY	I	Key input signal
27	DOWN KEY	I	Key input signal
28	LEFT KEY	I	Key input signal
29	EXECUTE KEY	I	Key input signal
30	MENU KEY	I	Key input signal
31	Vcc		+5 V
32	PRINT (LED)	O	Printing indicator: On when LED output signal is 1
33	ALARM (LED)	O	Alarm indicator: On when led output signal is 1
34			
35			
36			
37	LCD ENABLE	O	Data read/write start signal(Active = 1)
38			
39	$\overline{\text{LCD WR}}$	O	Data read/write selection signal
40	Vss		GND
41			
42	LCD V$_0$ - 0	O	LC drive power supply DA Bit 0
43	LCD V$_0$ - 1	O	LC drive power supply DA Bit 1
44	LCD V$_0$ - 2	O	LC drive power supply DA Bit 2
45			
46			
47			
48	LCD RS	O	Register selection signal
49	LCD DB$_0$	O	Data Bus 0
50	LCD DB$_1$	O	Data Bus 1
51	LCD DB$_2$	O	Data Bus 2
52	LCD DB$_3$	O	Data Bus 3
53	LCD DB$_4$	O	Data Bus 4
54	LCD DB$_5$	O	Data Bus 5
55	LCD DB$_6$	O	Data Bus 6
56	LCD DB$_7$	O	Data Bus 7
57	SY ENABLE	I	SY serial communications enable
58	KY ENABLE	O	KY serial communications enable
59			
60	SIRCS SIGNAL	I	Remote control input signal
61	SIRCS SIGNAL(IRQo)	I	
62	BUSY	I	CRT screen display IC busy signal
63			
64	ESET	I	CPU reset input

Table. 6-5

SONY

SONY - SP0165

COLOR VIDEO PRINTER

UP-5100
UP-5150
UP-5200MD
UP-5250MD

SERVICE MANUAL

CORRECTION-1

Please add and replace your manual with this CORRECTION-1.

5-20. Y/C SEP Y Adjustment (VA-26 Board)

Page	Incorrect	Correct
140	Spec. TP 303 (L-5) A=Minimum (Less than 0.05 V p-p)	TP 323 (F-3) A=Minimun (less than 0.02 V p-p)

SECTION 7. ELECTRICAL PARTS LIST (UP-5200MD/5250MD only)

Page	Incorrect	Correct
172	* A-8271-102-A SY-9 BOARD,COMPLETE	* A-8271-102-A SY-9 BOARD,COMPLETE(UP-5200MD) * A-8271-113-A SY-9 BOARD,COMPLETE(UP-5250MD)
173	IC5 8-759-500-67 IC AM27C010-155DC	IC4 8-759-067-76 IC AM27C512-SY9NV1.2 IC5 8-759-058-91 IC HN27C101AP-SY9GV1.0

SECTION 7. ELECTRICAL PARTS LIST

Page	Incorrect	Correct
182	⚠* 1-413-688-11 POWER SUPPLY (VTR-P3A)BOARD	⚠* 1-413-688-11 REGULATOR,SWITCHING (VTR-P3A)

- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

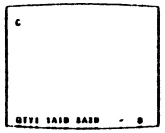
The components identified by shading and mark ⚠ are critical for safety.
Replace only with part numer specified.

Add the follows to SECTION-1 GENERAL.

When you turn on the printer, the initial screen message appears.

SONY COLOR VIDEO PRINTER

Once the printer is ready, the following message appears. You can erase this message (see "Erasing screen messages"). This screen is called the regular screen.


C
QTY1 1A1B 2A2B - S

C (Caption) (See page 63.)

C is displayed when you print a caption consisting of the date and/or comments.

Note

When you first turn on the printer, "C" does not appear. This C appears only when you select the caption input function.

QTY (Quantity)

QTY indicates the number of copies to be printed (see page 36). This item blinks while the printer is busy. Also, the color changes to indicate the progress, as follows:

Printing start - yellow - magenta - cyan - printing ends

1A1B 2A2B

Whichever memory you select appears in green.

Note

The UP-5100 printer has only one memory. Thus, "1A1B" appears on the screen.

S

S indicates the type of image shown on the monitor screen.

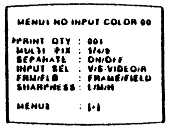
S (Source): An image being played back from a video deck is displayed on the screen.

M (Memory): An image stored in memory is displayed on the screen.

Menus displayed

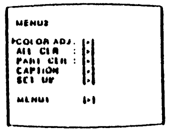
Either of two menus can be displayed.

MENU 1


MENU1 NO INPUT COLOR 00
▶PRINT QTY : 001
MULTI PIX : 1/4/9
SEPARATE : ON/OFF
INPUT SEL : V/S-VIDEO/R
FRM/FLD : FRAME/FIELD
SHARPNESS : L/M/H
MENU2 : [▷]

When the regular screen is on the monitor, you can display MENU 1 by pressing the MENU button.

MENU 2


MENU2
▶COLOR ADJ. : [▷]
ALL CLR : [▷]
PART CLR : [▷]
CAPTION [▷]
SET UP [▷]
MENU1 [▷]

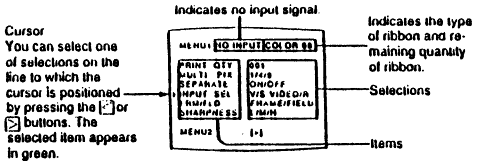
To select MENU 2, move the cursor ▶ to "MENU 2" on the MENU 1 screen and press the [⁝] button.

You can select the input signal and operations, adjust print quality and set the printer by using the menus. For details of the tree-structure of menus, see "Screen display on video monitor and printer window display."

Note

On menus, QTY memory page, S or M and * that indicates a reduced image do not appear. But, you can use the basic operation buttons such as PRINT, MEMORY IN, STOP, SOURCE/MEMORY and MEMORY PAGE. When you return the regular screen, rewritten messages newly appear on the screen.

How to read menus


Indicates no input signal.
Cursor
You can select one of selections on the line to which the cursor is positioned by pressing the [◁] or [▷] buttons. The selected item appears in green.
MENU1 NO INPUT COLOR 00
PRINT QTY
MULTI PIX
SEPARATE
INPUT SEL
FRM/FLD
SHARPNESS
001
1/4/9
ON/OFF
V/S VIDEO/R
FRAME/FIELD
L/M/H
MENU2 [▷]
Indicates the type of ribbon and remaining quanity of ribbon.
Selections
Items

Selected selections are displayed in green.

Adjusting the color

This subsection explains how to adjust the printout color.
You can adjust the following on the menu screen.

- Color intensity (R/G/B)
- Picture contrast (DARK/LIGHT)

Presetting

You can preset three print colors. This operation is called presetting. The color intensity and picture contrast of a printout are determined by one of three presettings. These presettings remain in the printer even when you turn the power off. One way of adjusting an image is to change the presetting completely; the other is to temporarily adjust the displayed setting without storing it.

Adjust the color using the following procedure.

When presetting

Displaying an input signal or an image stored in memory on the video monitor
↓
Displaying the menus and then the COLOR ADJUST screen.
↓
Selecting the presetting number
↓
Adjusting the color intensity and picture contrast
↓
Storing the presetting

When adjusting the displayed setting without storing

Displaying an input signal or an image stored in memory on the video monitor
↓
Displaying the menus and then the COLOR ADJUST screen.
↓
Selecting the presetting number
↓
Adjusting the color intensity and picture contrast

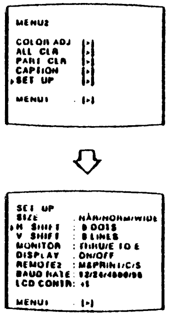
While adjusting the color, TEMP appears in green to the right of the PRESET item. This TEMP indicates that the setting is temporary and not stored. If you subsequently print, the printer prints the image with the newly preset values. The TEMP presetting is cleared, however, when you turn the power off.

The SET UP menu allows you to set up the printer specifications.

Displaying the SET UP menu

1 **Press the MENU button to display the MENU 1 screen. Move the cursor ▶ to MENU 2, then press the [▷] button.**

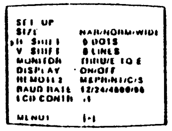
2 **Move the cursor ▶ to SET UP by pressing the [△] or [▽] buttons, then press the [▷] button.**



```
MENU2

 COLOR ADJ  [>]
 ALL  CLR   [>]
 PART CLR   [>]
 CAPTION    [>]
▶SET  UP    [>]

 MENU1     .[>]
```

```
 SET  UP
 SIZE      : NAR/NORM/WIDE
▶H  SHIFT  : 0 DOTS
 V  SHIFT  : 0 LINES
 MONITOR   : THRU/E TO E
 DISPLAY   : ON/OFF
 REMOTE2   : M&PRINT/C/S
 BAUD RATE : 12/24/4800/96
 LCD CONTR : +1

 MENU1     . [>]
```

The functions of the SET UP menu are outlined below.



```
 SET  UP
 SIZE        NAR/NORM/WIDE
▶H  SHIFT    0 DOTS
 V  SHIFT    0 LINES
 MONITOR     THRU/E TO E
 DISPLAY     ON/OFF
 REMOTE 2    M&PRINT/C/S
 BAUD RATE   12/24/4800/96
 LCD CONTR   +1

 MENU1       [>]
```

SIZE
Setting the print size.

H SHIFT
Shifting the printout horizontally

V SHIFT
Shifting the printout vertically

MONITOR
Setting the video signal output from the MONITOR connector on the printer

DISPLAY
Turning the character display on the video monitor on or off

REMOTE 2
Setting the printer operation when the printer receives the signal from REMOTE 2 connector

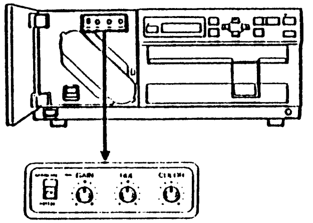
BAUD RATE
Setting the baud rate of the RS-232C connector

LCD CONTR
Adjusting the contrast of the printer window

Video recorded under poor conditions may have poor color quality. If the format is an NTSC composite video signal or separate luminance (Y) and chrominance (C) signals, you can correct the color to a certain extent.

Before starting adjustment

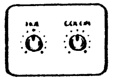
Set the HUE and COLOR controls to the center detents.



Note
Do not change the MONITOR RGB control setting on the rear of the printer, or the color control setting of the video monitor when a video signal is input to the video monitor.

Compensating

Adjust HUE and COLOR while viewing the input signal on the video monitor.



Note
You cannot adjust an image stored in memory. Adjust the picture quality before storing and printing an image.

About the GAIN AUTO/MANUAL selector and GAIN control
The GAIN AUTO/MANUAL selector and GAIN control are used to adjust the input signal to the optimum level for printing.
When the GAIN AUTO/MANUAL selector is set to AUTO, if a signal is weak, that is it has a low amplitude - the AGC (automatic gain control) amplifies it so that it results in a good printout. However, the AGC may cause an unnatural brightness in some cases. For example, a dark scene may be printed much lighter than it appears on the monitor. In this case, set the GAIN AUTO/MANUAL selector to MANUAL and make the adjustments necessary with the GAIN control. When the input level is appropriate, we recommend you to select the manual adjusting.

Note
For an RGB signal, if the input level of each signal is different, you cannot adjust the input signals with the GAIN control.

To produce a satisfactory printout of the image on the video monitor, adjust the monitor and printer colors so that the video monitor colors are the same as those of the printout. Perform the adjustment with the MONITOR RGB controls on the rear of the printer.
The printer outputs either of the two kinds of video signals according to the printer specifications.

- E to E: Signals are output to the video monitor after being processed by the printer's circuitry
- THRU (through): Signals are output to the video monitor
  At the factory, the printer is adjusted such that the images for both signals appear identical. If they are different, the settings of the printer's controls may not be correct. Check the settings of the MONITOR RGB, HUE, COLOR and GAIN controls.

When the video monitor color does not match that of the printout, adjust as follows.

1 Adjusting the monitor color

Even if the printer is correctly adjusted, the video monitor may not be correctly adjusted. This may happen when you replace the video monitor.
If the color of the monitor is adjusted using the controls on the printer, it is difficult to check whether the video monitor is itself correctly adjusted. When you don't want to move the controls on the printer, adjust the monitor color with the video monitor controls, using the through signal that is output directly to the monitor without being processed by the printer's circuitry.

1 **Press the MENU button to display the MENU 1 screen.**

2 **Move the cursor ▶ to MENU 2, then press the [▸] button.**
MENU 2 appears.

3 **Move the cursor ▶ to SET UP, then press the [▸] button.**
The SET UP menu appears.

4 **Move the cursor ▶ to MONITOR, then switch THRU to green by pressing the [▴] or [▾] buttons.**
The signal is output to the video monitor.

5 **Press the MENU button to return to the regular screen.**

6 **Adjust the color of the monitor by using monitor controls.**

2 Adjusting the color of the printer's output signal

To adjust the color of the printer's output signal to the video monitor, change the output signal to that which is processed by the printer's circuits. First print the image and adjust controls on the printer while comparing the printout with the image on the video monitor.

1 **Press the MENU button to display the MENU 1 screen.**

2 **Move the cursor ▶ to MENU 2, then press the [ ] button.**
MENU 2 appears.

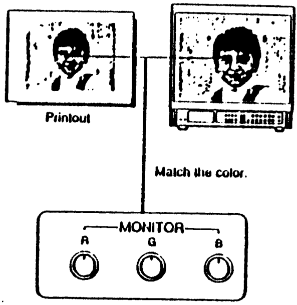
3 **Move the cursor ▶ to SET UP, then press the [ ] button.**
The SET UP menu appears.

4 **Move the cursor ▶ to MONITOR, then switch E TO E to green by pressing the [ ] or [ ] buttons.**
The signal is output to the video monitor, after being processed by the printer's circuits.

5 **Press the MENU button to return to the regular screen.**

6 **Store a new image (for color adjusting) and print it.**

7 **Adjust the MONITOR RGB controls on the rear of the printer to match monitor color with the printout color.**

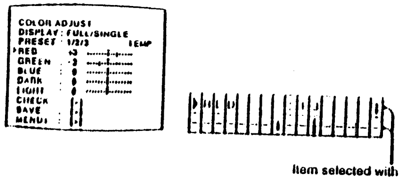


Note
The MONITOR RGB controls are used to adjust the color of the output signal from the printer when the video monitor color is unsatisfactory. This adjustment does not affect the printout. To adjust the quality of the printouts, see page 40.

When you want to see an image that is hidden behind a screen message (C, QTY1, 1A1B and others), you can erase the screen message. The printer operations are identical, regardless of whether messages are displayed on the screen. The messages can always be seen on the printer display window.

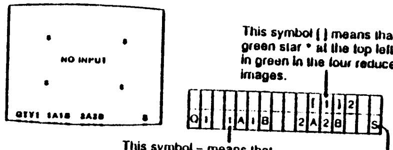
Screen display **Printer window display**

Menu screen



Item selected with the cursor on the menu screen is displayed on the printer window

Regular screen



This symbol [ ] means that the green star * at the top left lights in green in the four reduced images.

This symbol – means that 1A 1B is selected.

Bottom line of regular screen is displayed on the printer window

For detailed information on screen display and window display, see page 81.

1 **Press the MENU button to display the MENU 1 screen.**

2 **Move the cursor ▶ to MENU 2, then press the [ ] button.**
MENU 2 appears.

3 **Move the cursor ▶ to SET UP, then press the [ ] button.**
The SET UP menu appears.

4 **Move the cursor ▶ to DISPLAY, then switch OFF to green by pressing the [ ] or [ ] buttons.**

To display screen messages
At step 4, switch ON to green.

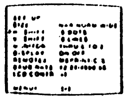
Note
If you set the printer output signal specification to THRU (through), screen messages do not appear even when you switch ON to green.
In this case, press the SOURCE/MEMORY button. The image stored in memory appears on the video monitor and you can check the present condition.
However, error messages can appear at any time.

Sometimes, a black line appears on the printouts, although it does not appear on the video monitor. A portion where there is no video signal is printed in black. This may occur when you make printouts after connecting a different video source or play back a different video software.
If a black line appears on the printout, adjust the printer as follows.

1 **Press the MENU button to display the MENU 1 screen.**

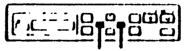
2 **Move the cursor ▶ to MENU 2, then press the [ ] button.**
MENU 2 appears.

3 **Move the cursor ▶ to SET UP, then press the [ ] button.**
The SET UP menu appears.

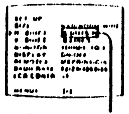


4 **Move the cursor ▶ to H SHIFT when the black line is on the right or left.**

5 **Adjust the horizontal number by pressing the [ ] or [ ] buttons.**
You can shift the image to the right by up to 36 dots and to the left by up to 22 dots in steps of 2 dots.
When you shift the image to the right of the standard position, R (right) appears.
When you shift the image to the left from the standard position, L (left) appears.

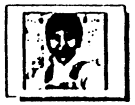


Move to the left Move to the right.



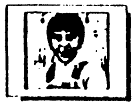
This means that the image moves to the right from the standard by 6 dots.

When the black line is on the right



Shift the image to the right by pressing the [ ] button

When the black line is on the left



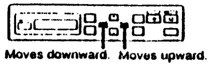
Shift the image to the left by pressing the [ ] button.

By pressing the [ ] and [ ] buttons together, the image position returns to the standard position. However, this function is not available when you are using the remote control unit.

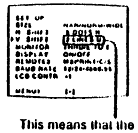
Note
When it is difficult to check whether the black line appears on the monitor, make a printout of four reduced images so that you can see any black line clearly.

6 **Move the cursor ▶ to V SHIFT when the black line is at the top or bottom.**

7 **Adjust the vertical number by pressing the [ ] or [ ] buttons.**
You can shift the image up or down by 3 lines.
When you shift the image up from the standard position, U (up) appears.
When you shift the image down from the standard position, D (down) appears.

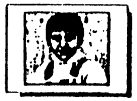


Moves downward. Moves upward.



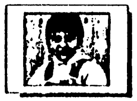
This means that the image moves up from the standard by 2 lines.

When the black line is at the bottom



Shift the image down by pressing the [ ] button.

When the black line is at the top



Shift the image up by pressing the [ ] button.

8 **Press the MENU button to return to the regular screen.**
The black line is also stored in memory with the previous image. Thus, store a new image in the memory and print it to check whether the black line disappears.

Note
When the black line still remains even after adjusting H SHIFT or V SHIFT, change the size to smaller one.

Setting the Screen Size

When you print an image that is narrower or wider than the standard screen size, you can change the screen size.
The printer supports the following three sizes as standard.
NAR (narrow): 708 (H) × 462 (V) (dots × lines)
Use this size when a black line appears on the printout.
NORM (normal): 720 (H) × 468 (V) (dots × lines)
Use this size normally.
WIDE: 756 (H) × 486 (V) (dots × lines)
Use this size to print when the signal scans beyond the edge of the regular screen.

Note
It is not recommended that general users use the WIDE size. In WIDE mode, the video monitor may not work correctly because the scanned portion exceeds the range that the video monitor can support.

1 **Press the MENU button to display the MENU 1 screen.**

2 **Move the cursor ▶ to MENU 2, then press the [▷] button.**
MENU 2 appears.

3 **Move the cursor ▶ to SET UP, then press the [▷] button.**
The SET UP menu appears.

4 **Move the cursor ▶ to SIZE.**

5 **Switch the desired size to green.**
NAR: When the signal scans within the limits of the regular screen (when the black lines appear in normal size even though you shift the image with the H SHIFT or V SHIFT function
NORM: Regular screen size
WIDE: When the signal scans outside the limit of the regular screen

You can control the printer with either of the following two options connected to the REMOTE 2 connector on the rear panel.

- FS-20 foot switch (not supplied) (see page 21)
- Pulse signal (see page 83)

The printer operates in one of the following three modes when receiving a pulse signal, according to the printer setting. You set the operation from a menu.

M(MEMORY) & PRINT:
Stores an image in memory and printing it at the same time

CYCLIC M(MEMORY):
Stores images in memory cyclically

M(MEMORY) STOP: Stores an image in one memory whenever the printer receives a pulse signal The printer stops storing images in the memory when images have been stored in all memories.

Setting Operation Mode

1 **Press the MENU button to display the MENU 1 screen.**

2 **Move the cursor ▶ to MENU 2, then press the [↵] button.**
MENU 2 appears.

3 **Move the cursor ▶ to SET UP, then press the [↵] button.**
The SET UP menu appears.

4 **Move the cursor ▶ to REMOTE 2.**

5 **Switch the desired operation mode to green.**
M (M & PRINT): Stores an image in memory and printing it at the same time
The memory page is not changed.
C (CYCLIC M): Stores images in memory cyclically
M(M STOP): Stores an image in one memory whenever the printer receives a pulse signal. The printer stops storing images in memory when images have been stored in all memories. Message STOP STOP STOP appears.

When STOP STOP STOP appears
Press the STOP button. (All buttons other than the STOP button are not active.)

Notes

- When you select M, the printer stores an image and prints it at the same time. When you select either of the other two, the printer only stores the images in memory. To print those images, select the memory page and print it.
- When you select C, the printer continues to store images by replacing a previously stored image with a new one.

You can set up the following printer specifications in addition to those explained in this chapter.

- Communication speed between the printer and a computer
- Contrast of window display

Setting the baud rate

You can control the communication speed with a computer connected to the RS-232C connector on the rear panel. For details, see "Color Video Printer Interface Manual UPM-5000" (not supplied).
You can set up the baud rate from the SET UP menu.

1 **Press the MENU button to display the MENU 1 screen.**

2 **Move the cursor ▶ to MENU 2, then press the [↵] button.**
MENU 2 appears.

3 **Move the cursor ▶ to SET UP, then press the [↵] button.**
The SET UP menu appears.

4 **Move the cursor ▶ to BAUD RATE.**
All digits of the selected baud rate are displayed. Only the high-order two digits of the remaining baud rates are displayed.

5 **Switch the desired baud rate to green.**
The selected baud rate is displayed in green, with all digits shown (00 is added).

Adjusting the contrast of the window display

You can adjust the contrast of the window display.

1 **Move the cursor ▶ to LCD CONTR of the SET UP menu.**

2 **Adjust the contrast of the window display by pressing the [–] or [+] buttons.**

To make the contrast stronger, press the [+] button.
To make the contrast weaker, press the [–] button.

The printer window display is different from the screen display on the monitor because the display range is narrower and the number of characters is limited. The contents are the same.

Tree-structure of menus

This subsection explains the structure of menus and how to make use of the tree-structure of menus.

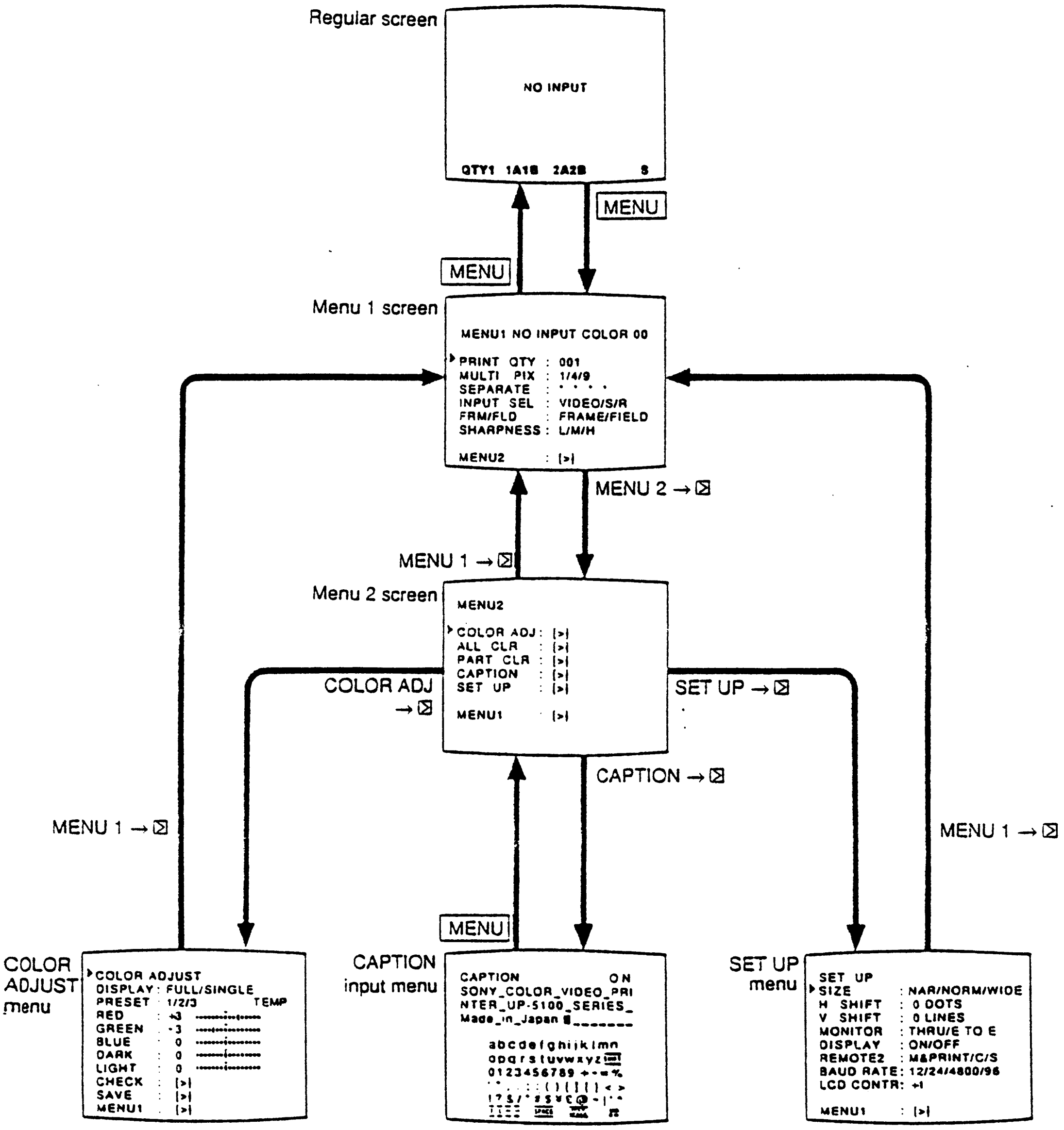
In the chart,

☐ indicates the button to press.

All capital, items like COLOR ADJUST indicate the menu message.

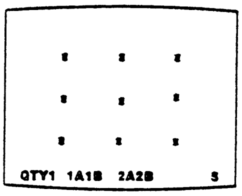
Example:COLOR ADJUST (in capitals)→○

You move the cursor ► to the message, then press the ○ button.

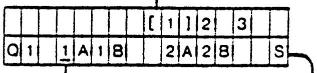

Regular screen
NO INPUT
QTY1 1A1B 2A2B S
MENU
MENU
Menu 1 screen
MENU1 NO INPUT COLOR 00
▸PRINT QTY : 001
MULTI PIX : 1/4/9
SEPARATE : • • • •
INPUT SEL : VIDEO/S/R
FRM/FLD : FRAME/FIELD
SHARPNESS : L/M/H
MENU2 : |>|
MENU 2 → ▷
MENU 1 → ▷
Menu 2 screen
MENU2
▸COLOR ADJ : |>|
ALL CLR : |>|
PART CLR : |>|
CAPTION : |>|
SET UP : |>|
MENU1 |>|
COLOR ADJ → ▷
SET UP → ▷
CAPTION → ▷
MENU 1 → ▷
MENU 1 → ▷
MENU
COLOR ADJUST menu
▸COLOR ADJUST
DISPLAY : FULL/SINGLE
PRESET 1/2/3 TEMP
RED : +3
GREEN -3
BLUE 0
DARK : 0
LIGHT : 0
CHECK : |>|
SAVE : |>|
MENU1 |>|
CAPTION input menu
CAPTION ON
SONY_COLOR_VIDEO_PRI
NTER_UP-5100_SERIES_
Made_in_Japan
abcdefghijklmn
opqrstuvwxyz
0123456789 +-=%
( ) [ ] { } < >
! ? $ / # $ ¥ £ @ - |
SPACE
SET UP menu
SET UP
▸SIZE : NAR/NORM/WIDE
H SHIFT : 0 DOTS
V SHIFT : 0 LINES
MONITOR : THRU/E TO E
DISPLAY : ON/OFF
REMOTE2 : M&PRINT/C/S
BAUD RATE : 12/24/4800/96
LCD CONTR : +1
MENU1 : |>|

Differences between video monitor and printer displays

Regular screen



```
QTY1 1A1■ 2A2■     S
```



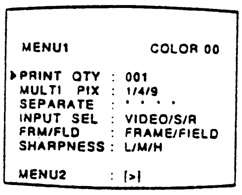
```
        [1]2 3
Q1 1A1B  2A2B  S
```

[ ] indicates the position where the green star * is placed on the multi-image screen.

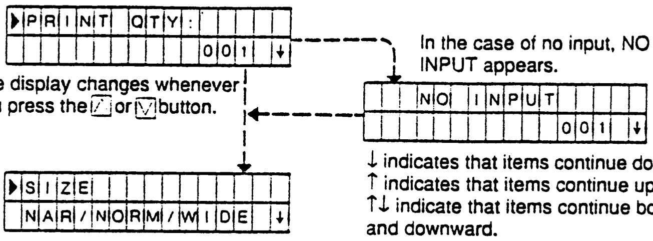
Indicates the selected memery

Displays the bottom line of the screen

MENU 1 and MENU 2



```
MENU1            COLOR 00

▶PRINT QTY  : 001
 MULTI  PIX : 1/4/9
 SEPARATE   : • • • •
 INPUT SEL  : VIDEO/S/R
 FRM/FLD    : FRAME/FIELD
 SHARPNESS  : L/M/H

 MENU2      : [>]
```



```
▶PRINT QTY:
           001 ↓
```

```
  NO INPUT
           001 ↓
```

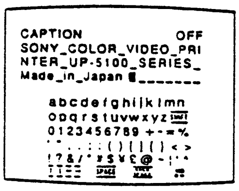
```
▶SIZE
 NAR/NORM/WIDE ↓
```

The display changes whenever you press the △ or ▽ button.

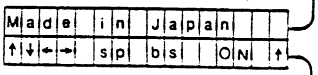
In the case of no input, NO INPUT appears.

↓ indicates that items continue downward.
↑ indicates that items continue upward.
↑↓ indicate that items continue both upward and downward.

CAPTION input



```
CAPTION                 OFF
SONY_COLOR_VIDEO_PRI
NTER_UP-5100_SERIES_
Made_in_Japan ■_______

  abcdefghijklmn
  opqrstuvwxyz
  0123456789 +-=%
```

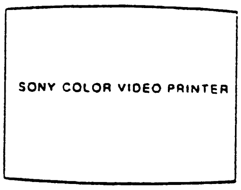


```
Made in Japan
↑↓←→ sp bs  ON ↑
```

The line in the character display area where the cursor is placed is displayed.

The line in the character enter area where the cursor is placed.

Message screen



```
SONY COLOR VIDEO PRINTER
```

Messages are displayed.

```
   SONY COLOR
 VIDEO PRINTER
```